December 2, 2013

To: College of Charleston Curriculum Committee  
From: Pamela Riggs-Gelasco,  
Chair, Department of Chemistry and Biochemistry  
RE: Paperwork for curriculum changes

Last year, we received the results of our five-year re-accreditation review from the American Chemical Society. The results of the review combined with new ACS guidelines for approved programs necessitated us re-evaluating our curriculum to appropriately give students a required number of laboratory hours. Prior to this review, ACS allowed us to count lab courses outside our department towards accreditation. This is no longer allowed unless a course has substantial chemical content, nor can we count general chemistry lab hours towards accreditation. Some of the changes outlined in the bulleted list below are to address these new requirements, specifically that accredited degrees must offer 400 contact hours in the lab. The biochemistry degree will change substantially in the types of courses required for the degree and in the number of credit hours required to successfully earn an ACS-certified degree.

In addition, we would like to address complaints of both students and faculty about our physical chemistry sequence. The students have long complained about the mathematical rigor of the yearlong sequence of physical chemistry, courses that require elements of linear algebra, differential equations, Calculus II concepts, and Calculus III concepts. Faculty teaching in this sequence have been frustrated by the lack of student preparation and their need to introduce complex mathematical concepts prior to teaching the derivations of chemical principles that are the essence of these courses. To address these concerns, we propose to replace our current Calculus II degree requirement with a newly designed upper level math course that will offer a menu of concepts required to understand physical chemistry. The math department has worked closely with us to develop this new 5-credit course, Vector Calculus with Chemical Applications.

Lastly, we would like to make numerous changes to course numbering in the catalog for courses numbered above the 500-level to better match the level at which the courses are currently taught. Finally, we would like to modify our current course, Chem 221/221L from a 4 credit lecture/0 credit lab combination to a 3 credit lecture/2 credit lab so that it matches the current contact hours of the course (3 hours of lecture/6 hours of lab per week).

This document contains required forms for all of the changes in the list below, organized in sets. Please note that the degree changes form will be presented at the end so that it can combine all needed changes in a single form. At the end of the forms, the revised degree worksheets for the chemistry BA, biochemistry BS, and the Chemistry BS are provided.
Set 1:
*Deactivate Course:* Chem 511, "Advanced Inorganic Chemistry"
*Introduce new Name and Number:* Chem 311 "Inorganic Chemistry"
*Pre-requisite Change:* remove Chemistry 341/342 as a pre-requisite and replace with Chem 232 pre-requisite.
*Rationale:* Inorganic chemistry is not currently taught at the graduate level or with the need for physical chemistry as a pre-requisite.
*Forms Included:* New Course (Chem 311), Deactivate Course (Chem 511), Syllabus for Chem 311
*Note:* the degree change form is presented at the end to reflect all cumulative changes.

Set 2:
*Name and Number Change:* Chem 512L, "Advanced Inorganic Chemistry Laboratory" to Chem 312L, "Inorganic Chemistry Laboratory"
*Pre-requisite/co-requisite Change:* Chem 311 will be the co-requisite or pre-requisite of Chem 312L.
*Rationale:* Inorganic synthesis is not taught at the graduate level; course number for lab is different from lecture to reflect that some students do not all need to take the lab.
*Forms Included:* New Course (Chem 312L), Deactivate Course (Chem 512L), Syllabus for Chem 312L
*Note:* the degree change form is presented at the end to reflect all cumulative changes.

Set 3:
*Number Change:* Chem 522, Environmental Chemistry, to Chem 422, Environmental Chemistry
*Number Change:* Chem 522L, Environmental Chemistry Lab, to Chem 422L Environmental Chemistry Lab
*Rationale:* Environmental Chemistry requires only a 200-level course as a pre-requisite.
*Forms Included:* Change Course form (Chem 422), Deactivate Course form (Chem 522), Change Course form (Chem 422L), Deactivate Course form (Chem 522L)

Set 4:
*Number Change:* CHEM 583, Special Topics, to Chem 483.
*Rationale:* Request from registrar to remove 500 level courses
*Forms Included:* Change Course form (Chem 483), Deactivate Course form (Chem 583)

Set 5:
*Deactivate Course:* Chem 528, Nuclear and Radiochemistry
*Rationale:* Our current staff is unlikely to offer this course.
*Forms included:* Deactivate an Existing Course (Chem 528)

Set 6:
*Deactivate Course:* Chem 526, Introduction to Nuclear and Radiochemistry
*Rationale:* Our current staff is unlikely to offer this course.
*Forms included:* Deactivate an Existing Course (Chem 526)

Set 7:
*Deactivate Courses:* Chem 221/221L (4 credits/0 credits)
*Introduce New Course:* Chem 220/220L (3 credits/2 credits)
Rationale: new courses will appropriately account for current contact hours of this course. Course helps to better account for the ACS accreditation guidelines for lab hours.

Forms included: Copy of acknowledgement from Biology, New course form (Chem 220/220L combined), Deactivate course form (Chem 221/Chem 221 combined), Course Syllabus (Chem 220), Course syllabus (Chem 220L).
Note: the degree change form is presented at the end to reflect all cumulative changes.

Set 8:
Deactivate Course: Chem 521/521L (4 credits/0 credits)
Introduce new course: Replace Chem 521 with new number with modified credit hour distribution: Chem 421/421L (3 credits/1 credit)
Rationale: Instrumental Analysis is not taught at the graduate level; most courses in our department have separate lab and lecture grades with distinct lab courses listed in catalog.
Forms included: New course form (Chem 421/421L combined), Deactivation form (Chem 521/521L combined), Course Syllabus (Chem 421), Course Syllabus (Chem 421L).
Note: the degree change form is presented at the end to reflect all cumulative changes.

Set 9:
Number change: Chem 531, Advanced Organic, to Chem 431.
Rationale: Registrar would like all undergraduate courses to be numbered below 499.
Forms included: Change course form (Chem 431), Deactivate Course form (Chem 531).

Set 10:
Number change: Chem 541, Advanced Physical Chemistry to Chem 441
Rationale: Registrar would like all undergraduate courses to be numbered below 499.
Forms included: Change course form (Chem 441), Deactivate Course form (Chem 541).

Set 11:
Introduce New Course: Math 229, Vector Calculus with Chemical Applications, 5 credits
Replace Degree Requirement: Change Math 220 requirement to Math 229 for Chemistry BS, Chemistry BA, and Biochemistry BS
Rationale: New course will better address needed math skills for chemists
Forms included: Copy of Chemistry Letter, New course form, Syllabus for Math 229
Note: the degree change form is presented at the end to reflect all cumulative changes.

Set 12:
Pre-requisite Change, Name change and course description update: Remove Chem 341/341L pre-requisite for Chem 342/342L and Chem 341/341L; change name of Chem 342 from “Physical Chemistry II” to “Quantum Chemistry and Spectroscopy”; change name of Chem 341 from “Physical Chemistry I” to “Thermodynamics, Statistical Thermodynamics, and Kinetics”
Rationale: The topics in each physical chemistry course do not build on one another and current pre-requisites limits student scheduling; revise pre-reqs so 341 and 342 can be taken in either order and change math pre-reqs to the new math course (Math 249)
Forms Included: Change course form (Chem 342); Change course form (Chem 341); Change course form (342L); Change course form (341L)
Set 13:
*Pre-requisite Change to Co-requisite:* Remove the Chem 351 pre-requisite for Chem 354 and replace it with a Chem 351 co-requisite.
*Rationale:* Encourages students to take Chem 354 earlier and sets up the future development of a second semester lab course for the year-long Biochemistry sequence.
*Forms included:* Change course form (Chem 354)

Set 14:
*Degree Changes for Biochemistry degree:* remove the 4th elective course taken in the Biology department (Cell Biology, Microbiology, Genetics, Physiology) and replace it with two menus of courses centered in the Chemistry department. Include one menu for lab experience and one menu for a lecture experience. Lab menu will include at least two of the following that add up to 3-credits: Chem 321L (1) (new numbering), Chem 312L (1) (new numbering), Chem 481 (2), Chem 482 (1), Chem 371 (4), Chem 421L (1) (new numbering), Chem 355 (2). The lecture menu will include one of the following options: Chem 421 (new numbering), Chem 353, Chem 356, Chem 422 (new numbering), Chem 431 (new numbering).
*Rationale:* The biology courses are no longer approved lab experiences for ACS certification. The lab menu will allow students to accumulate 400 lab hours. The lecture menu will replace the Biology lecture and allows us to develop capstone courses, should the ACS require these in the future (*new changes are being announced this year). New requirements allow students to count research hours (481, 482) towards degree and lab hour count.
*Forms included:* Change Program Form Biochemistry BS, Comparison of Changes before and after

Set 15: New Degree Requirements for Chemistry BS
*Forms included:* Change Program Form

Set 16: New Degree Requirements for Chemistry BA
*Forms included:* Change Program Form

Set 17: New Degree Requirements for Chemistry minor
*Forms included:* Change Program Form

Set 18: New Degree Requirements for Marine Biology BS
*Forms included:* Biology acknowledgement

Set 19: New Degree Requirements for Chemistry with Secondary Education Cognate
*Forms included:* Change Program Form, Acknowledgment from School of Education

Set 20: Program of Study Worksheets modified with all the proposed changes
*Forms included:* Chemistry BA, Chemistry BS, Biochemistry BS, Marine Biology BS, Chemistry BA with secondary Ed cognate

Set 21: Sample Curriculum Roadmap for New Biochemistry major vs. Old Biochemistry major
· In section A, list ALL of the forms covered by this signature page. If you submit a form that is not listed in A, your proposal will be held back until we receive a new, updated signature page.
· You must obtain the signature of your department chair and dean before submitting your proposal.

A. FORMS COVERED BY THIS SIGNATURE PAGE.
CHEM 311: Course; CHEM 511: Course; CHEM 312L: Course; CHEM 512L: Course; CHEM 422: Course; CHEM 522: Course; CHEM 522L: Course; CHEM 422L: Course; CHEM 583: Course; CHEM 483: Course; CHEM 528: Course; CHEM 526: Course; CHEM 221/221L: Course; CHEM 220/220L: Course; CHEM 521/521L: Course; CHEM 421/421L: Course; CHEM 431: Course; CHEM 531: Course; CHEM 541: Course; CHEM 441: Course; Math 229: Course; CHEM 342: Course; CHEM 341: Course; CHEM 341L: Course; CHEM 342L: Course; CHEM 354: Course; Biochemistry BS: Change Program; Chemistry BS: Change Program; Chemistry BA: Change Program; Chemistry BA with Ed: Change Program; Chemistry Minor: Program Change

B. APPROVAL AND SIGNATURES.

1. Signature of Department Chair or Program Director: (CHEMISTRY)
   [Signature]
   Date: 12-5-13

2. Signature of Department Chair or Program Director: (MATH)
   [Signature]
   Date: 12/5/2013

3. Signature of Academic Dean:
   [Signature]
   Date: 12/5/2013

4. Signature of Provost:
   [Signature]
   Date: 1/5/2014

5. Signature of Business Affairs (only for course fees):
   [Signature]
   Date: ____________
   □ fee approved on ____________
   □ BOT approval pending

6. Signature of Curriculum Committee Chair:
   [Signature]
   Date: ____________

7. Signature of Budget Committee Chair (only for new programs):
   [Signature]
   Date: ____________

8. Signature of Academic Planning Committee Chair (only for new programs):
   [Signature]
   Date: ____________

9. Signature of Faculty Senate Secretary:
   [Signature]
   Date: ____________

Date Approved by Faculty Senate: ____________
FACULTY CURRICULUM COMMITTEE
SIGNATURE PAGE

- In section A, list ALL of the forms covered by this signature page. If you submit a form that is not listed in A, your proposal will be held back until we receive a new, updated signature page.
- You must obtain the signature of your department chair and dean before submitting your proposal.

A. FORMS COVERED BY THIS SIGNATURE PAGE.
CHEM 311: Course; CHEM 511: Course; CHEM 312L: Course; CHEM 512L: Course; CHEM 422: Course; CHEM 522: Course; CHEM 522L: Course; CHEM 422L: Course; CHEM 523: Course; CHEM 483: Course; CHEM 528: Course; CHEM 526: Course; CHEM 221/221L: Course; CHEM 220/220L: Course; CHEM 521/521L: Course; CHEM 421/421L: Course; CHEM 431: Course; CHEM 531: Course; CHEM 541: Course; CHEM 44: Course; Math 229: Course; CHEM 342: Course; CHEM 341: Course; CHEM 341L: Course; CHEM 342L: Course; CHEM 354: Course; Biochemistry BS: Change Program; Chemistry BS: Change Program; Chemistry BA: Change Program; Chemistry BA with Ed: Change Program; Chemistry Minor: Program Change

B. APPROVAL AND SIGNATURES.

1. Signature of Department Chair or Program Director: (CHEMISTRY)
   
   [Signature]
   Date: 12-5-13

2. Signature of Department Chair or Program Director: (MATH)
   
   [Signature]
   Date: 12-5-2013

3. Signature of Academic Dean:
   
   [Signature]
   Date: 12-5-2013

4. Signature of Provost:
   
   [Signature]
   Date: 1-5-2014

5. Signature of Business Affairs (only for course fees):
   
   [Signature]
   Date: ________________  □ fee approved on ________________  □ BOT approval pending

6. Signature of Curriculum Committee Chair:
   
   [Signature]
   Date: ________________

7. Signature of Budget Committee Chair (only for new programs):
   
   [Signature]
   Date: ________________

8. Signature of Academic Planning Committee Chair (only for new programs):
   
   [Signature]
   Date: ________________

9. Signature of Faculty Senate Secretary:
   
   [Signature]
   Date: ________________

Date Approved by Faculty Senate: ________________
SET 1: ADD a New Course Chem 311

FACULTY CURRICULUM COMMITTEE

COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco   Phone: 3-7455   Email: gelascop@cofc.edu

Department or Program: CHEM School: SSM

Subject Acronym and Course Number: CHEM 311

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☑ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
  ☐ Course Number
  ☐ Course Name
  ☐ Course Description
  ☐ Credit/Contact Hours
  ☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

We are requesting to remove CHEM 511 (Advanced Inorganic Chemistry) and add a course CHEM 311 in its place, Inorganic Chemistry. This new course is identical to the current course in inorganic chemistry, Chem 511. Chem 511 was originally numbered as a 500-level course so as to allow graduate students to receive credit for taking it. Over the lifespan of this course, no graduate students have ever taken the course as it does not completely fit in any graduate program offered at the College of Charleston. Therefore, we are renumbering it and renaming it to make the course more appropriately fit in the sequence of courses required for a chemistry or biochemistry major.

The pre-requisites of the new course Chem 311 will be Chem 232/232L to appropriately reflect the true prerequisites required for successful completion of the course (Chem 511 listed a co- or pre-req of Chem 341 or 342 which is not really necessary to be successful in the course). Chem 311, like Chem 511, will not be taught with the assumption of any physical chemistry knowledge beyond the general chemistry level.

D. IMPACT ON EXISTING PROGRAMS AND COURSES.

Chem 311 will replace Chem 511 as the required inorganic chemistry course for Chemistry and Biochemistry majors. There is no net change in the required hours or the required material for the major with this set of changes.

This form was last updated on 06/03/13 and replaces all others.
including three extra credit exams, extra credit online materials, extra credit writing assignments and an extra credit final exam. If you choose to do any of the extra credit, you forfeit the 59.4% for the course and begin at 0%. Your final grade will be determined by the sum of 0% plus any extra credit you complete.

It is not my policy to allow make-up extra credit examinations. In the event you do have to miss an examination, you must notify me as soon as possible so suitable accommodations can be made. If you fail to confer with me concerning a missed examination, you will receive a zero for that examination.

Extra credit problem sets will be administered electronically and deadlines are firm. The possibility for deadline extensions does not exist except only in truly unusual circumstances. Ample time to complete the online problem sets will always be given.

The Honor system is in effect in all your efforts for this course. Cheating will not be tolerated. If you are caught cheating, a grade of “F” will automatically be given and you will be brought before the Honor Board. Please refer to the Department’s policy on Scientific Integrity for more information. By enrolling in this course, you are agreeing to abide by the Departmental policy on Scientific Integrity.

You are not competing against everybody else in the class nor are there a set number of grades that will be given. It should be your objective to do the best you can on all the work. I firmly believe that teachers do not give grades, students earn them.

Extra Credit Examination Schedule

There are three extra credit exams given over the course of the semester. The dates of the exams are flexible but you will always be given at least one week’s notice before any of the in-class exams.

Extra Credit Final Examination Information

The extra credit final examination will be given during the normally scheduled time (Monday, April 29 at 9 am). The exam will be similar in format to a regular lecture examination and will not be comprehensive; it will only cover material from the third examination and beyond.

Important Dates

January 21 – Martin Luther King, Jr. Holiday
March 4-8 – Spring Break
March 25 – Last day to withdraw from classes with the grade of “W”
April 24 – Last day of classes
April 29 – Extra Credit Final exam, 9 am
E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: School: Subject Acronym: Course Number:

Credit hours: ___lecture ___lab ___seminar ___independent study
Contact hours: ___lecture ___lab ___seminar ___independent study

Course title:

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.): Pre-requisites or co-requisites:

Cross-listing, if any:

Is this course repeatable? ☑ yes ☐ no If yes, how many total credit hours may the student earn? ___

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: CHEM School: SSM Subject Acronym: CHEM Course Number: 311

Credit hours: ___3___lecture ___lab ___seminar ___independent study
Contact hours: ___3___lecture ___lab ___seminar ___independent study

Course title: Inorganic Chemistry

Course description (maximum 50 words, exactly as it appears in the catalog):

An advanced course that aims to provide a balanced view of the theoretical principles involved in present-day inorganic research. Topics include atomic structure, chemical bonding, coordination chemistry, symmetry and applications, organometallic chemistry, and chemistry of the main group elements.

Restrictions (pre-requisites, co-requisites, majors only, etc.): Pre-requisites: CHEM 232 and 232L

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? ☑ yes ☐ no
If so, which course? Chem 511
Note: You must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department):
Note: Cross-listed courses are equivalent.

Is this course repeatable? ☑ yes ☐ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? ☐ yes ☑ no What is the fee? $____
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.
## G. COSTS

List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

No new costs are associated with this change. No cost savings are associated with this change.

## H. STUDENT LEARNING OUTCOMES AND ASSESSMENT

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the course?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
<tr>
<td>1. Know the fundamentals of the electronic structure of atoms and ions</td>
<td>All students are assessed over the course of the semester through written exams (4 per semester) in class. Each test evaluates ~25% of the listed outcomes. Further, all students are assessed over the topics through the use of online assessments. Students should do well enough to satisfactorily pass the course and anticipated pass rate is 90%.</td>
</tr>
<tr>
<td>2. Understand the basics of bonding including how Lewis structures are used to represent bonding</td>
<td>Finally, all students are assessed in general inorganic knowledge through the use of the Major Field Test administered by the department and required of all graduating students (administered once). This examination is given outside the realm of the lecture course but is nevertheless an important tool for our department in assessing where students are in their knowledge of inorganic chemistry. We anticipate that 70% of students who have completed inorganic chemistry before they take the exam will score in the 60th percentile or above nationwide.</td>
</tr>
<tr>
<td>3. Predict the geometry and polarity of molecules and polyatomic ions</td>
<td></td>
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<tr>
<td>4. Use symmetry and group theory to understand point groups as well as apply this knowledge for deducing the IR and Raman behavior of molecules</td>
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<tr>
<td>5. Know the principles of molecular orbital theory</td>
<td></td>
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<tr>
<td>6. Be able to understand the principles of Lewis acids and bases</td>
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<tr>
<td>7. Understand the structure of solid-state materials including defects and bonding</td>
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<tr>
<td>8. Know the fundamentals of ligand field theory for the common geometries</td>
<td></td>
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<tr>
<td>9. Identify how the electronic structure of a coordination compound influences its kinetic behavior as well as the major mechanisms of reaction</td>
<td></td>
</tr>
<tr>
<td>10. Understand the basic ideas of organometallic chemistry including electron counting, bonding, the major types of reactions</td>
<td></td>
</tr>
<tr>
<td>11. Apply common organometallic reactions used in catalytic cycles</td>
<td></td>
</tr>
<tr>
<td>12. Know the major roles of metal species in biological</td>
<td></td>
</tr>
</tbody>
</table>
SET 1: ADD a New Course Chem 311

| species as well as understand the role of metals in the environment |

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

The main SLO that will be facilitated by the addition of the new course is: Chemistry and Biochemistry majors will demonstrate proficiency in one or more of the more narrowly defined sub-disciplines of Chemistry, which include Analytical, Biochemistry, Inorganic, Organic, or Physical chemistry. This is the only course in inorganic chemistry in our department and is critical for developing proficiency in this area of chemistry.

In addition, this course is required for an American Chemical Society-certified degree in chemistry or biochemistry and meets their guidelines as such.

Inorganic chemistry content is introduced in this course; however, it reinforces concepts in organic chemistry and general chemistry.

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☑ yes ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

Please note: the Chem 311 course will replace Chem 511 as the required inorganic chemistry course.

J. CHECKLIST.

☐ I have completed all relevant parts of the form.

☐ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.

This form was last updated on 06/03/13 and replaces all others.
SET 1: DEACTIVATE Course, Chem 511

FACULTY CURRICULUM COMMITTEE

COURSE FORM

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- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco     Phone: 3-7455     Email: gelascop@cofc.edu

Department or Program: CHEM School: SSM
Subject Acronym and Course Number: CHEM 511
Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☐ Course Number
☐ Course Name
☐ Course Description
☐ Credit/Contact Hours
☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☒ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

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The pre-requisites of the new course Chem 311 will be Chem 232/232I to appropriately reflect the true prerequisites required for successful completion of the course (Chem 511 listed a co- or pre-req of Chem 341 or 342 which is not really necessary to be successful in the course). Chem 311, like Chem 511, will not be taught with the assumption of any physical chemistry knowledge beyond the general chemistry level.

D. IMPACT ON EXISTING PROGRAMS AND COURSES.

Chem 311 will replace Chem 511 as the required inorganic chemistry course for Chemistry and Biochemistry majors. There is no net change in the required hours or the required material for the major with this set of changes.

This form was last updated on 06/03/13 and replaces all others.
Chemistry 311, Inorganic Chemistry

Instructor: Dr. Jason Overby
Office: SSMB 318
Office Hours: MWF 11-12; MW 1-2; others by arrangement (contact me directly, by email or by phone)
e-mail: overbyj@cofc.edu
Homepage: http://overbyj.people.cofc.edu/
Phone: 953-8098

Description of Course

An advanced course that aims to provide a balanced view of the theoretical principles involved in present-day inorganic research. Topics include atomic structure, chemical bonding, coordination chemistry, symmetry and applications, organometallic chemistry, and chemistry of the main group elements.

Prerequisites

Chem 232

Text (required)

Inorganic Chemistry, 5th Edition, Miessler & Tarr
Chemistry 311 Class Pack, 9th Edition

Supplemental materials

Please visit my homepage for up-to-date information concerning the course. Copies of the syllabus, handouts and exams will be posted there as well as other important information related to the course.

Learning Objectives

After completing the course, you should be able to do the following:

Know the fundamentals of the electronic structure of atoms and ions
Understand the basics of bonding including how Lewis structures are used to represent bonding
Predict the geometry and polarity of molecules and polyatomic ions
Use symmetry and group theory to understand point groups as well as apply this knowledge for deducing the IR and Raman behavior of molecules
Know the principles of molecular orbital theory
Be able to understand the principles of Lewis acids and bases
Understand the structure of solid-state materials including defects and bonding
Know the fundamentals of ligand field theory for the common geometries
Identify how the electronic structure of a coordination compound influences its kinetic behavior as well as the major mechanisms of reaction
Understand the basic ideas of organometallic chemistry including electron counting, bonding, the major types of reactions
Apply common organometallic reactions used in catalytic cycles
Know the major roles of metal species in biological species as well as understand the role of metals in the environment

Class policies

Attendance at all class meetings is expected. You are expected to budget your time wisely and meet your obligations for this class. Experience has demonstrated that there is a strong correlation between your grade in the class and your attendance. You are responsible for learning the material when you miss class. My time in office hours is not for catching you up on material you missed. In the event you miss a lecture period, please check the webpage for a synopsis of that day's lecture.

Grading Scheme

<table>
<thead>
<tr>
<th>Extra Credit Examinations</th>
<th>60%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra Credit Problem Sets</td>
<td>10%</td>
</tr>
<tr>
<td>Extra Credit Writing Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Extra Credit Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

Grading Scale

A  92-100
A−  90-91
B+  88-89
B   82-87
B−  80-81
C+  78-79
C   72-77
C−  70-71
D+  68-69
D   62-67
D−  60-61
F   below 60

Grading Policy

There is no required work in this course. You are given 59.4% for the course with no work necessary. There are a number of extra credit opportunities in this course
Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. **You must do this before your request can move forward!**
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pam Riggs-Gelasco  Phone: 3-7455  Email: gelascp@cofc.edu

Department or Program: Chemistry and Biochemistry  School: SSM

Subject Acronym and Course Number: CHEM 312L

Catalog Year in which changes will take effect: FALL 14

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

- Add a New Course (complete parts C, D, F, G, H, I, J, K)
- Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
  - Course Number (you must submit a course deactivation request for the old course number)
  - Course Name
  - Course Description
  - Credit/Contact Hours
  - Restrictions (prerequisites, corequisites, junior/senior standing, etc.)
- Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
- Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

We are requesting to remove CHEM 512L (Advanced Inorganic Chemistry Laboratory) and add a course CHEM 312L in its place, Inorganic Chemistry Laboratory. This new course will be identical to the current course in inorganic chemistry lab, Chem 512L, except that Chem 311 will be listed as a corequisite. Chem 512L was originally numbered as a 500-level course so as to allow graduate students to receive credit for taking it. Over the lifespan of this course, no graduate students have ever taken the course as it does not completely fit in any graduate program offered at the College of Charleston. Therefore, we are renumbering it and renaming it to make the course more appropriately fit in the sequence of courses required for a chemistry or biochemistry major.

The corequisite of the new course Chem 312L will be Chem 311. Chem 311 will not have a corequisite of Chem 312L, however, as the biochemistry majors are required to take the lecture, but not the lab. This is also why we are not calling the course 311L, so students recognize that you do not have to take the lab concurrently with the lecture.
SET 1: DEACTIVATE Course, Chem 511

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: CHEM School: SSM Subject Acronym: CHEM Course Number: 511

Credit hours: 3 hrs lecture 0 lab
Contact hours: 3 hrs lecture 0 lab

Course title: Advanced Inorganic Chemistry

Course description (maximum 50 words, exactly as it appears in the catalog): An advanced course that aims to provide a balanced view of the theoretical principles involved in the present-day inorganic research. Topics include atomic structure, chemical bonding, coordination chemistry, symmetry and applications, organometallic chemistry, and chemistry of the main group elements.

Restrictions (pre-requisites, co-requisites, majors only, etc.): Pre-requisites or co-requisites: Co-requisite or pre-requisite: CHEM 341 and 342

Cross-listing, if any:

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? ___

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: CHEM School: SSM Subject Acronym: CHEM Course Number: 311

Credit hours: lecture __ lab __ seminar __ independent study
Contact hours: lecture __ lab __ seminar __ independent study

Course title:

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? ☐ yes ☒ no
If so, which course? ___
Note: You must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department):
Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? ☐ yes ☒ no What is the fee? $_____ 
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.
SET 1: DEACTIVATE Course, Chem 511

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

No new costs are associated with this change. No cost savings are associated with this change.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
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<tr>
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<th>Assessment Method and Performance Expected</th>
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<td>3.</td>
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<tr>
<td>4.</td>
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</tbody>
</table>

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration?  ☒ yes  ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

Please note: the Chem 311 course will replace Chem 511 as the required inorganic chemistry course

J. CHECKLIST.

☒ I have completed all relevant parts of the form.
SET 2: Deactivate Course, CHEM 512L

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pam Riggs-Gelasco         Phone: 3-7455         Email: gelascp@cofc.edu

Department or Program: Chemistry and Biochemistry         School: SSM

Subject Acronym and Course Number: CHEM 512L

Catalog Year in which changes will take effect: FALL 14

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
  ☐ Course Number (you must submit a course deactivation request for the old course number)
  ☐ Course Name
  ☐ Course Description
  ☐ Credit/Contact Hours
  ☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☒ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

We are requesting to remove CHEM 512L (Advanced Inorganic Chemistry Laboratory) and add a course CHEM 312L in its place, Inorganic Chemistry Laboratory. This new course will be identical to the current course in inorganic chemistry lab, Chem 512L, except that Chem 311 will be listed as a co-requisite. Chem 512L was originally numbered as a 500-level course so as to allow graduate students to receive credit for taking it. Over the lifespan of this course, no graduate students have ever taken the course as it does not completely fit in any graduate program offered at the College of Charleston. Therefore, we are renumbering it and renaming it to make the course more appropriately fit in the sequence of courses required for a chemistry or biochemistry major.

The co-requisite of the new course Chem 312L will be Chem 311. Chem 311 will not have a co-requisite of Chem 312L, however, as the biochemistry majors are required to take the lecture, but not the lab. This is also why we are not calling the course 311L, so students recognize that you do not have to take the lab concurrently with the lecture.

This form was last updated on 11/19/13 and replaces all others.
Laboratory notebook 10%
Laboratory reports 65%
Laboratory technique 10%
Final laboratory project 15%

Grading Scale

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<tr>
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<th>Score</th>
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<tr>
<td>A−</td>
<td>90-91</td>
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<tr>
<td>D−</td>
<td>60-61</td>
</tr>
<tr>
<td>F</td>
<td>below 60</td>
</tr>
</tbody>
</table>

Grading Policy

The Honor system is in effect in all your efforts for this course. Cheating will not be tolerated. If you are caught cheating, a grade of "F" will automatically be given and you will be brought before the Honor Board. Please refer to the Department's policy on Scientific Integrity for more information. By enrolling in this course, you are agreeing to abide by the Departmental policy on Scientific Integrity.

You are not competing against everybody else in the class nor are there a set number of grades that will be given. It should be your objective to do the best you can on all the work. I firmly believe that teachers do not give grades, students earn them.

Final Project

The final project details will be handed out in class approximately one month before the end of the semester. There are no excuses for late projects.

Important Dates

January 21 – Martin Luther King, Jr. Holiday
March 4-8 – Spring Break
March 25 – Last day to withdraw from classes with the grade of “W”
April 24 – Last day of classes
April 29 – Extra Credit Final exam, 9 am
D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

Chem 312L will replace Chem 512L as the required inorganic chemistry lab course for Chemistry BS majors. There is no net change in the required hours or the required material for the major with this set of changes.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department:       School:     Subject Acronym:       Course Number:     

Credit hours:     _ lecture _ lab _ seminar _ independent study  
Contact hours:     _ lecture _ lab _ seminar _ independent study  

Course title:     

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):  

Cross-listing, if any:  

Is this course repeatable?  □ yes  □ no  If yes, how many total credit hours may the student earn?  

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use **boldface** for the information that is changing.

Department: Chemistry and Biochemistry  School: SSM  Subject Acronym: CHEM  Course Number: 312L.

Credit hours: 1 lab  
Contact hours: 3 lab  

Course title: Inorganic Chemistry Laboratory  

Course description (maximum 50 words, exactly as it appears in the catalog):

A study of advanced methods for synthesis, separation, and identification of inorganic compounds. Laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.): Co-requisite CHEM 311  

If this is a newly-created course, is it intended to be the equivalent of an existing course?  □ yes  □ no  
If so, which course? CHEM 512L

This form was last updated on 11/19/13 and replaces all others.
SET 2: Add New Course, Chem 312L

If equivalent, will the newly-created course replace the existing course? □ yes  □ no
Note: If yes, you must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department): ____________
Note: Cross-listed courses are equivalent.

Is this course repeatable? □ yes  □ no  If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? □ yes  □ no  What is the fee? $125

Please note that the fee is standard of all lab courses in Chemistry and replaces that of the existing approved fee for Chem 512L

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There are no new costs for the course; it is the same course that is already offered under Chem 512L.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the course?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
<tr>
<td>1. Conduct syntheses and characterizations of a variety of inorganic compounds</td>
<td>All students will report their synthetic methods, yields, characterizations in written lab reports for evaluation by the instructor each week. Students who pass the course must be proficient in these skills. Estimated passage rate is 90%</td>
</tr>
<tr>
<td>2. Collect and analyze experimental data</td>
<td>All students will demonstrate ability to analyze experimental data on a single final examination. Students who pass the course must be proficient in these skills. Estimated passage rate is 90%</td>
</tr>
<tr>
<td>3. Develop proficiency in preparing and editing journal-style articles relating experimental data to scientific audiences</td>
<td>All students will prepare multiple journal style products that report their findings, interpretations, and data. Students will be evaluated with a rubric. Students who pass the course must be proficient in these skills. Estimated passage rate is 90%</td>
</tr>
</tbody>
</table>

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

The main SLO that will be facilitated by the addition of the new course is: Chemistry majors will demonstrate proficiency in one or more of the more narrowly defined sub-disciplines of Chemistry, which include Analytical, Biochemistry, Inorganic, Organic, or Physical chemistry. This is the only lab course in inorganic chemistry in our department and is critical for developing proficiency in this area of chemistry.

In addition, this course is required for an American Chemical Society-certified degree in chemistry and meets their guidelines as such.

Inorganic chemistry content is introduced in this course; however, it reinforces concepts in organic chemistry.
SET 2: Add New Course, Chem 312L

labs and general chemistry labs.

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☑ yes ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☒ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
Chemistry 312L, Inorganic Chemistry Laboratory

Instructor: Dr. Jason Overby
Office: SSMB 318
Office Hours: MWF 11-12; MW 1-2; others by arrangement (contact me directly, by email or by phone)
e-mail: overbyj@cofc.edu
Homepage: http://overbyj.people.cofc.edu/
Phone: 953-8098

Description of Course

A study of advanced methods for synthesis, separation, and identification of inorganic compounds.

Prerequisites

Chem 232L

Text (required)

None required. Procedures will be given on handouts in class.

Supplemental materials

Please visit my homepage for up-to-date information concerning the course. Copies of the syllabus, handouts and exams will be posted there as well as other important information related to the course.

Learning Objectives

After completing the course, you should be able to do the following:

Conduct syntheses and characterizations of a variety of inorganic compounds
Collect and analyze experimental data
Develop proficiency in preparing and editing journal-style articles relating experimental data to scientific audiences

Class policies

Attendance at all laboratory periods is required. You are expected to budget your time wisely and meet your obligations for this class. If you know you must miss a laboratory period for an excused reason, accommodations can potentially be made.

Grading Scheme
D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

Chem 312L will replace Chem 512L as the required inorganic chemistry lab course for Chemistry BS majors. There is no net change in the required hours or the required material for the major with this set of changes.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.
Department: Chemistry and Biochemistry  School: SSM  Subject Acronym: CHEM  Course Number: 512L

Credit hours: 1 lab
Contact hours: 3 lab

Course title: Advanced Inorganic Chemistry Laboratory

Course description (maximum 50 words, exactly as it appears in the catalog):
A study of advanced methods for synthesis, separation, and identification of inorganic compounds. Laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.): Prerequisite: CHEM 511

Cross-listing, if any:

Is this course repeatable? □ yes  □ no  If yes, how many total credit hours may the student earn? ___

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use **boldface** for the information that is changing.

Department:  School:  Subject Acronym:  Course Number:

Credit hours: _lecture _ lab _ seminar _ independent study
Contact hours: _ lecture _ lab _ seminar _ independent study

Course title:

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

If this is a newly-created course, is it intended to be the equivalent of an existing course? □ yes  □ no
If so, which course? ____________

If equivalent, will the newly-created course replace the existing course? □ yes  □ no

Note: If yes, you must deactivate that course by submitting an additional Course Form.

This form was last updated on 11/19/13 and replaces all others.
SET 2: Deactivate Course, CHEM 512L

Cross-listing, if any (submit approval from relevant department): ____________________

Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☐ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? ☐ yes ☐ no What is the fee? $_____

Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There are no new costs or savings from deactivating this course; the same course will be offered under a new number, Chem 311

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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2. 

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4. 

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?
SET 2: Deactivate Course, CHEM 512L

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☒ yes ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 3: Change Course Form, CHEM 422

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco  
Phone: 3-5587  
Email: gelascop@cofc.edu

Department or Program: CHEMISTRY  
School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 422 Environmental Chemistry

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☒ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☒ Course Number
☐ Course Name
☐ Course Description
☐ Credit/Contact Hours
☒ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This is an undergraduate course and the course number change is being made at the request of the Registrar’s office.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

This course replaces an existing course. We are simply changing the course number at the request of the registrar and updating the catalog description. Also, the pre-req course has a new number.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: CHEM  
School: SSM  
Subject Acronym: CHEM  
Course Number: 522

This form was last updated on 06/03/13 and replaces all others.
Course title: CHEM 522 Environmental Chemistry

Course description (maximum 50 words, exactly as it appears in the catalog):

CHEM 522 Environmental Chemistry
An introduction to the chemistry of environmental systems with an emphasis on marine and coastal and other problems. The cycling of chemical species, the effects of man-made inputs, and environmental analytical methodology will be stressed. Lectures three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
For CHEM 522 Prerequisite: CHEM 221 (old numbering)
For CHEM 522L Co-requisite or prerequisite: CHEM 522

Cross-listing, if any:

Is this course repeatable? ☐ yes ☒ no  If yes, how many total credit hours may the student earn? _____

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: Chemistry  School: SSM  Subject Acronym: CHEM  Course Number: _____

Credit hours: ☒ 3.0 lecture
Contact hours: ☒ 3.0 lecture

Course title: Environmental Chemistry Laboratory
Environmental Chemistry Laboratory
Course description (maximum 50 words, exactly as it appears in the catalog):

CHEM 422 Environmental Chemistry
An introduction to the chemistry of environmental systems, with an emphasis on marine and coastal and other problems. The cycling of chemical species, the effects of man-made inputs, and environmental analytical methodology will be stressed. Lectures three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Prerequisite CHEM 221 (new numbering)

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? ☐ yes ☐ no
If so, which course?
Note: You must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department):
Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☒ no  If yes, how many total credit hours may the student earn? _____

This form was last updated on 06/03/13 and replaces all others.
SET 3: Change Course Form, CHEM 422

Is there an activity, lab, or other fee associated with this course? ☐ yes ☒ no  What is the fee?

Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected. No changes in enrollment patterns are expected.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☒ yes ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

This form was last updated on 06/03/13 and replaces all others.
J. CHECKLIST.

☑ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☑ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 3: Change Course Form, CHEM 422L

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. **You must do this before your request can move forward!**
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: **Pamela Riggs-Gelasco** Phone: 3-5587 Email: gelascop@cofc.edu

Department or Program: **CHEMISTRY** School: **Sciences & Mathematics**

Subject Acronym and Course Number: **CHEM 422L**

Environmental Chemistry Laboratory

Catalog Year in which changes will take effect: **FALL 2014**

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

- [ ] Add a New Course (complete parts C, D, F, G, H, I, J, K)
- [x] Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
- [ ] Course Number
- [ ] Course Name
- [x] Course Description
- [ ] Credit/Contact Hours
- [ ] Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
- [ ] Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
- [ ] Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This is an undergraduate course and the course number change is being made at the request of the Registrar’s office.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

No impact expected.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: **CHEM** School: **SSM** Subject Acronym: **CHEM** Course Number: **522L**

Credit hours: 1 lab **credit hour**

This form was last updated on 06/03/13 and replaces all others.
SET 3: Change Course Form, CHEM 422L
Contact hours: 3 lab contact hours

Course title: **Environmental Chemistry Laboratory**

Course description (maximum 50 words, exactly as it appears in the catalog):

**CHEM 522L Environmental Chemistry Laboratory (1)**
An introduction to sampling and measurement techniques used to characterize the environment. Electrochemical, spectroscopic and chromatographic techniques will be used with both laboratory and field investigations. Laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Corequisite or Prerequisite Chem 522 (old numbering)
Cross-listing, if any:

Is this course repeatable? ☐ yes ☒ no  If yes, how many total credit hours may the student earn? 6

**F. NEW COURSE INFORMATION.** If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use **boldface** for the information that is changing.

Department: Chemistry  School: SSM  Subject Acronym: CHEM Course Number: **522L**

Credit hours: _1_ lab credit hours
Contact hours: _3_ lab contact hours

Course title: Advanced Special Topics in Chemistry and Biochemistry
Course description (maximum 50 words, exactly as it appears in the catalog):

**CHEM 422L** An introduction to sampling and measurement techniques used to characterize the environment. Electrochemical, spectroscopic and chromatographic techniques will be used laboratory and field investigations Laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Corequisite or Prerequisite Chem **422** (new numbering)

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? ☐ yes ☐ no
If so, which course? 583
Note: You must deactivate that course by submitting an additional Course Form.

**NOTE:** This is not a newly created course, but the changed course will replace a course and we are submitting a separate deactivation form for Chem 522L

Cross-listing, if any (submit approval from relevant department):
Note: Cross-listed courses are equivalent.

This form was last updated on 06/03/13 and replaces all others.
SET 3: Change Course Form, CHEM 422L

Is this course repeatable? ☑ yes ☐ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? ☑ yes ☐ no What is the fee? $125

Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

The laboratory fee for CHEM 522L—now called 422L—has already been approved.

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected. No changes in enrollment patterns are expected.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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<th>Student Learning Outcomes</th>
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How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☑ yes ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.
J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.

This form was last updated on 06/03/13 and replaces all others.
SET 3: Deactivate Course Form, CHEM 522

Faculty Curriculum Committee
Course Form

Instructions:

- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the part of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. Contact/Course Information.

Name: Pamela Riggs-Gelasco  Phone: 3-5587  Email: gelascop@cofc.edu

Department or Program: CHEMISTRY  School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 522 Environmental Chemistry

Catalog Year in which changes will take effect: FALL 2014

B. Type of Request. Please check all that apply, then fill out the specified parts of the form.

☐ Add a new course (complete parts C, D, F, G, H, I, J, K)
☐ Change part of an existing course (complete parts C, D, E, F, G, I, J, K)
  ☐ Course Number
  ☐ Course Name
  ☐ Course Description
  ☐ Credit/Contact Hours
  ☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☒ Deactivate an existing course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a previously-deactivated course (complete parts C, D, E, G, I, J, K)

C. Rationale and Explanation. Please describe your request and explain why you are making it.

The registrar asked us to renumber 500 level courses. The courses are being deactivated and replaced with a lower numbered identical course.

D. Impact on Existing Programs and Courses. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

The course is being removed and replaced with a lower course number. We are simply changing the course number at the request of the registrar and updating the catalog description.

E. Existing Course Information. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: CHEM  School: SSM  Subject Acronym: CHEM  Course Number: 522
SET 3: Deactivate Course Form, CHEM 522

Credit hours: _3_ lecture
Contact hours: _3_ lecture

Course title: CHEM 522 Environmental Chemistry

Course description (maximum 50 words, exactly as it appears in the catalog):

CHEM 522 Environmental Chemistry
An introduction to the chemistry of environmental systems with an emphasis on marine and coastal and other problems. The cycling of chemical species, the effects of man-made inputs, and environmental analytical methodology will be stressed. Lectures three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
For CHEM 522 Prerequisite; CHEM 221 (old numbering)
For CHEM 522L Co-requisite or prerequisite: CHEM 522
Cross-listing, if any:

Is this course repeatable? ☐ yes ☑ no If yes, how many total credit hours may the student earn? _____

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use **boldface** for the information that is changing.

Department: Chemistry School: SSM Subject Acronym: CHEM Course Number: 422

Credit hours:
Contact hours:

Course title:
Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? ☐ yes ☑ no
If so, which course?
*Note: You must deactivate that course by submitting an additional Course Form.*

Cross-listing, if any (submit approval from relevant department):
*Note: Cross-listed courses are equivalent.*

Is this course repeatable? ☐ yes ☑ no If yes, how many total credit hours may the student earn? _____

Is there an activity, lab, or other fee associated with this course? ☐ yes ☑ no What is the fee?
*Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.*

This form was last updated on 06/03/13 and replaces all others.
G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected. No changes in enrollment patterns are expected.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration?  

☐ yes ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.
SET 3: Deactivate Course Form, CHEM 522

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 3: Change Course Form, CHEM 422L

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco Phone: 3-5587 Email: gelascop@cofc.edu

Department or Program: CHEMISTRY School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 522L Environmental Chemistry Laboratory

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
  ☐ Course Number
  ☐ Course Name
  ☐ Course Description
  ☐ Credit/Contact Hours
  ☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☒ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This is an undergraduate course and the course number change is being made at the request of the Registrar's office.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

This course will be replaced with an identical course with a lower number. We are simply changing the course number at the request of the registrar.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: CHEM School: SSM Subject Acronym: CHEM Course Number: 522

Credit hours: 1 lab credit hour

This form was last updated on 06/03/13 and replaces all others.
SET 3: Change Course Form, CHEM 422L
Contact hours: 3 lab contact hours

Course title: CHEM 522L Environmental Chemistry Laboratory

Course description (maximum 50 words, exactly as it appears in the catalog):

CHEM 522L Environmental Chemistry Laboratory (1)
An introduction to sampling and measurement techniques used to characterize the environment. Electrochemical, spectroscopic and chromatographic techniques will be used with both laboratory and field investigations. Laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
For CHEM 522 Prerequisite; CHEM 221 (note this is the old numbering)

Cross-listing, if any:

Is this course repeatable? [ ] yes [ ] no If yes, how many total credit hours may the student earn? ___

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: School: Subject Acronym: Course Number:

Credit hours:
Contact hours:

Course title:
Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? [ ] yes [ ] no If so, which course?
Note: You must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department):
Note: Cross-listed courses are equivalent.

Is this course repeatable? [ ] yes [ ] no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? [ ] yes [ ] no What is the fee?
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

This form was last updated on 06/03/13 and replaces all others.
SET 3: Change Course Form, CHEM 422L.

There will be no change in costs. Teaching loads will not be affected. No changes in enrollment patterns are expected.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? □ yes □ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

This form was last updated on 06/03/13 and replaces all others.
SET 3: Change Course Form, CHEM 422L

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.

This form was last updated on 06/03/13 and replaces all others.
SET 4: Deactivate Course Form, CHEM 583

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco
Phone: 3-5587
Email: gelascop@cofc.edu

Department or Program: CHEMISTRY
School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 583
Advanced Special Topics in Chemistry and Biochemistry

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☐ Course Number
☐ Course Name
☐ Course Description
☐ Credit/Contact Hours
☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☒ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This is an undergraduate course and the course number change is being made at the request of the Registrar's office.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

No impact expected.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: CHEM
School: SSM
Subject Acronym: CHEM
Course Number: 583

Credit hours: 1.3 lecture credit hours

This form was last updated on 06/03/13 and replaces all others.
SET 4: Deactivate Course Form, CHEM 583
Contact hours: 1-3 lecture contact hours

Course title: Advanced Special Topics in Chemistry and Biochemistry

Course description (maximum 50 words, exactly as it appears in the catalog):

This course covers a special topic in chemistry or biochemistry, usually in an emerging area of research, in an area of industrial importance, or in an interdisciplinary field, at the level appropriate for a junior or senior level chemistry student.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Permission of instructor (note: an additional lab section, Chem 583L (0-1) may also be offered.

Cross-listing, if any:

Is this course repeatable? ☒ yes ☐ no If yes, how many total credit hours may the student earn? 6

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: Chemistry School: Subject Acronym: Course Number:

Credit hours:
Contact hours:

Course title:
Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? ☐ yes ☐ no
If so, which course? 583
Note: You must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department):
Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☐ no If yes, how many total credit hours may the student earn?

Is there an activity, lab, or other fee associated with this course? ☐ yes ☐ no What is the fee?
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

This form was last updated on 06/03/13 and replaces all others.
G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected. No changes in enrollment patterns are expected because the course is being replaced with a lower numbered course.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? □ yes □ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.
SET 4: Deactivate Course Form, CHEM 583

☑️ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☑️ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 4: Change Course Form, CHEM 583

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
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- Fill out the parts of the form specified in part B. **You must do this before your request can move forward!**
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT COURSE INFORMATION.

Name: Pamela Riggs-Gelasco  Phone: 3-5587  Email: gelascop@cofc.edu
Department or Program: CHEMISTRY  School: Sciences & Mathematics
Subject Acronym and Course Number: CHEM 583
Advanced Special Topics in Chemistry and Biochemistry
Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☒ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
   ☒ Course Number
   ☐ Course Name
   ☐ Course Description
   ☐ Credit/Contact Hours
   ☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Reactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This is an undergraduate course and the course number change is being made at the request of the Registrar’s office.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

No impact expected.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: CHEM  School: SSM  Subject Acronym: CHEM  Course Number: 583

Credit hours: 1-3 lecture credit hours

This form was last updated on 06/03/13 and replaces all others.
SET 4: Change Course Form, CHEM 583
Contact hours: 1-3 lecture contact hours

Course title: **Advanced Special Topics in Chemistry and Biochemistry**

Course description (maximum 50 words, exactly as it appears in the catalog):

This course covers a special topic in chemistry or biochemistry, usually in an emerging area of research, in an area of industrial importance, or in an interdisciplinary field, at the level appropriate for a junior or senior level chemistry student.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Permission of instructor (note: an additional lab section, Chem 583L (0-1) may also be offered.

Cross-listing, if any:

Is this course repeatable? ☒ yes ☐ no If yes, how many total credit hours may the student earn? 6

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: Chemistry       School: SSM       Subject Acronym: CHEM
Course title: Advanced Special Topics in Chemistry and Biochemistry
Course description (maximum 50 words, exactly as it appears in the catalog):

This course covers a special topic in chemistry or biochemistry, usually in an emerging area of research, in an area of industrial importance, or in an interdisciplinary field, at the level appropriate for a junior or senior level chemistry student.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Permission of instructor (note: an additional lab section, Chem 583L (0-1) may also be offered.

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? ☒ yes ☐ no
If so, which course? 583

Note: You must deactivate that course by submitting an additional Course Form.

NOTE: This is not a newly created course, but the changed course will replace a course and we are submitting a separate deactivation form for Chem 583

Cross-listing, if any (submit approval from relevant department):

Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? ___
SET 4: Change Course Form, CHEM 583

Is there an activity, lab, or other fee associated with this course? □ yes □ no What is the fee?
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected. No changes in enrollment patterns are expected.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
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<tr>
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How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? □ yes □ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

This form was last updated on 06/03/13 and replaces all others.
J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 5: Deactivation of Chem 528

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. **You must do this before your request can move forward!**
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco  Phone: 3-5587  Email: gelascop@cofc.edu

Department or Program: CHEMISTRY  School: SCIENCES & MATHEMATICS

Subject Acronym and Course Number: CHEM 528

Catalog Year in which changes will take effect: FALL.

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
  ☐ Course Number (you must submit a course deactivation request for the old course number)
  ☐ Course Name
  ☐ Course Description
  ☐ Credit/Contact Hours
  ☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☒ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

The faculty member who taught this course is deceased and there are no plans to teach this course in the future. This course has not been taught in a number of years.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

This course is not a required course for any program and has not been taught in a number of years.
SET 5: Deactivation of Chem 528

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: Chemistry School: SSM Subject Acronym: CHEM Course Number: 528

Credit hours: _3_ lecture __ lab __ seminar __ independent study
Contact hours: _3_ lecture __ lab __ seminar __ independent study

Course title: Nuclear and Radiochemistry (3)

Course description (maximum 50 words, exactly as it appears in the catalog):

An introduction to nuclear and radiochemistry stressing the fundamentals of nuclear structure; systematics of nuclear decay; the detection and measurement of radiation; radiation protection; and the role of nuclear chemistry in medical, environmental and scientific applications. The nuclear fuel cycle and nuclear waste problems will be discussed. Lectures three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Prerequisites: CHEM 221 or 231 and 231L, or permission of the instructor.
Note: A student cannot receive credit for both CHEM 526 and CHEM 528.
Cross-listing, if any:

Is this course repeatable? ☐ yes ☐ no If yes, how many total credit hours may the student earn? ______

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: School: Subject Acronym: Course Number:

Credit hours: __ lecture __ lab __ seminar __ independent study
Contact hours: __ lecture __ lab __ seminar __ independent study

Course title:

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

If this is a newly-created course, is it intended to be the equivalent of an existing course? ☐ yes ☐ no
If so, which course? ____________

If equivalent, will the newly-created course replace the existing course? ☐ yes ☐ no
Note: If yes, you must deactivate that course by submitting an additional Course Form.
SET 5: Deactivation of Chem 528

Cross-listing, if any (submit approval from relevant department): _______________

Note: Cross-listed courses are equivalent.

Is this course repeatable? □ yes □ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? □ yes □ no What is the fee? $_____  
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

No change in costs. This course is being deactivated and has not been taught in several years.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?
SET 5: Deactivation of Chem 528

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☐ yes ☒ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

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FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. **You must do this before your request can move forward!**
- Remember that your changes will not be implemented until the next catalog year at the earliest.
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A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Celasco  
Phone: 3-5587  
Email: gelascop@cofc.edu

Department or Program: CHEMISTRY  
School: SCIENCES & MATHEMATICS

Subject Acronym and Course Number: CHEM 526

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

- [ ] Add a New Course (complete parts C, D, F, G, H, I, J, K)
- [ ] Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
  - [ ] Course Number (you must submit a course deactivation request for the old course number)
  - [ ] Course Name
  - [ ] Course Description
  - [ ] Credit/Contact Hours
  - [ ] Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
- [x] Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
- [ ] Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

The faculty member who taught this course is deceased and there are no plans to teach this course in the future. This course has not been taught in a number of years.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

This course is not a required course for any program and has not been taught in a number of years.
E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: Chemistry School: SSM Subject Acronym: CHEM Course Number: 526

Credit hours: _1_ lecture _ _lab _ _ seminar _ _ independent study
Contact hours: _1_ lecture _ _lab _ _ seminar _ _ independent study

Course title: Introduction to Nuclear and Radiochemistry

Course description (maximum 50 words, exactly as it appears in the catalog):

An introduction to the fundamental theories and applications of nuclear and radiochemistry. This short course surveys the structure of the nucleus, radioactive decay modes, the detection and measurement of nuclear radiation and application of radiochemical method as to medical, environmental and scientific problems. Lecture three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Prerequisites: CHEM 221 or CHEM 231 and CHEM 231L, or permission of the instructor.
Note: A student cannot receive credit for both CHEM 526 and CHEM 528.

Cross-listing, if any:

Is this course repeatable? □ yes □ no If yes, how many total credit hours may the student earn? _____

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use **boldface** for the information that is changing.

Department: School: Subject Acronym: Course Number:

Credit hours: _ _ lecture _ _ lab _ _ seminar _ _ independent study
Contact hours: _ _ lecture _ _ lab _ _ seminar _ _ independent study

Course title:

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

If this is a newly-created course, is it intended to be the equivalent of an existing course? □ yes □ no
If so, which course? ______________

If equivalent, will the newly-created course replace the existing course? □ yes □ no

This form was last updated on 11/19/13 and replaces all others.
SET 6: Deactivate Chem 526

Note: If yes, you must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department): _______________
Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☐ no If yes, how many total credit hours may the student earn? ____

Is there an activity, lab, or other fee associated with this course? ☐ yes ☐ no What is the fee? $____
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

No change in costs. This course is being deactivated and has not been taught in several years.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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This form was last updated on 11/19/13 and replaces all others.
SET 6: Deactivate Chem 526

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration?  □ yes  □ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
Re: Chemistry curriculum changes that affect Biology

Hillenius, Willem Jacob

To: Higgins-Wilke, Pam Jo

Dear Pam,

The Department of Biology discussed these proposed changes today at our faculty meeting. We have no objections to these changes, and support your department’s efforts to strengthen its curriculum.

Sincerely,

Jaap

Jaap Hillenius
Professor & Chair
Department of Biology
College of Charleston
66 George Street
Charleston, SC 29424
USA

T: (843) 953-5504
F: (843) 953-5453
E: hilleniusw@cofc.edu
Re: Chemistry curriculum changes that affect Biology

Hillenius, Willem Jacob

To: Renss-Grieco, Pamela Jn

Wednesday, November 23, 2013 3:41 PM

Jaap,

Attached are two documents that explain the proposed changes in the biochemistry degree and proposed course changes that affect biology majors. Below, here are the changes that affect your department:

1) Quantitative Analysis will go from 4 credits to 5 credits to reflect the current practice of 3 contact hours of lecture and 6 contact hours of lab. In addition, a separate grade will be assigned in lecture (3 credits) and lab (2 credits). This affects your marine biology majors who are not to take that class instead of the organic sequence. It does not reflect a real change in the course or in current practice. Up to now, students and faculty have not been getting appropriate credit for the number of contact hours in the course.

2) Biochemistry Lab (Chem 354) will no longer have a pre-req of Chem 351 (Biochemistry lecture 1). Instead, we will encourage both biochemistry majors and Biology Molec Track majors to take Chem 354 WITH Chem 351. However, they will not be co-requisites, to encourage more chemists and biologists and pre-med students to take the material in lecture. The new pre-req for Chem 354 would be Chem 232/Chem 232L. The course content of 354 is not changing. This affects your Molec Track majors, hopefully in a positive way that gives them more flexibility in planning their schedules.

3) As a result of our most recent 5-year review, the biochemistry degree must undergo restructuring if we want to keep American Chemical Society accreditation. This accreditation is important for students to be competitive for jobs and for graduate schools when they leave here and it is also important for the reputation of the department. For a degree to be ACS certified, students must have 400 lab contact hours beyond general chemistry and these must be centered in Chemistry courses or courses with heavy chemical content (judged by submission of syllabi and final exams during last review). In addition, we are expecting ACS to announce the requirement of a capstone course this year. To address these requirements while minimizing undue burden on the student, we have biochemistry students will now take a menu of lab courses (which now includes our research courses) in order to get their # of lab hours up to 400. They will have a menu of capstone lecture courses as well. This eliminates the "Arth elective class taken in Biology" (Miero, Cell, Physiology, or Genetics) for the biochemistry major. While we would anticipate that a few biochemistry students would still want to take these courses as preparation for medical school, hopefully it will free up spots in those courses for your own majors. ACS approved Molecular Biology as sufficiently chemical and we would like our majors to continue taking Bio 312/312L as part of their degree requirement, in addition to Biol 111 and Biol 112. I hope your department would still be willing to let these students register for these upper level courses (required or elective) without Math 250 on a case by case basis; the biochemistry students do get statistics in Chem 221 (soon to be Chem 220) in addition to lots of calculus, so it seems like a logical exception. The median grade of biochemistry majors in the elective biology classes is 3.7, so they seem to manage without the Math 250, at least in those courses.

If you could forward this email and the attached documents to the faculty in your department, I would appreciate it. I would be happy to discuss all of this at one of your department meetings if you feel that is necessary for your support.
CHEM 220 FALL 2014 8:00 - 9:15 TR SSMB 125
Dr. James P. Deavor Office: SSMB 130 953-8095 deavorj@cofc.edu

What Is a syllabus? A syllabus tells you what is expected of you and helps you understand what it will take for you to be successful in a course. The syllabus holds you the student accountable to class expectations. The standards and requirements set forth in this syllabus may be modified at any time by the course instructor. Notice of such changes will be by announcement in class or by written or email notice or by changes to this syllabus posted on OAKS. Latest update: August 19, 2013.

Catalog Description 220 Quantitative Analysis (4 credit hours)
A study of the fundamentals of analytical chemistry with special attention given to quantitative analysis including, volumetric analysis, electrochemical measurements, optical spectroscopy, chromatography, quality assurance, and calibration methods.

Prerequisite: CHEM 112 and 112L or HONS 294 and 294L. You are responsible for the contents of this prerequisite course. We will look at some new and more in-depth aspects of some of the topics you covered in the prerequisite courses, but you are responsible for relearning (if needed) the previously covered material.

Is this course for you? BA or BS in Chemistry (stepping stone)
BS in Biochemistry (stepping stone)
BS in Marine Biology (terminal course)
Minor in Chemistry (terminal course)
... or anyone just wanting to enhance their knowledge and lab technique

The techniques and tools of analytical chemistry play an important and vital role in archaeology, biology, forensics, medicine, environmental science, forensics, pharmacy, and toxicology. Please see the instructor ASAP if you have any questions as to whether this is the proper course for you.

Corequisite CHEM 220L is a co-requisite course. You must either be concurrently enrolled in the lab or else have already passed the lab. If either is dropped both must be dropped.


Academic Dishonesty Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved. Incidents where the instructor determines the student's actions are related more to a misunderstanding will handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student's file. Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student's transcript for two years after which the student may petition for the X to be expunged. The F is permanent. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

Students should be aware that unauthorized collaboration—working together without permission—is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others' exams, fabricating data, and giving unauthorized assistance. Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.

Students can find the complete Honor Code and all related processes in the Student Handbook at http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php
Attendance Policy  Attendance is expected at all classes. Students are responsible for all information presented in class whether they are present or not. It is imperative that you attend class and also to arrive promptly. It is extremely rude and discourteous to arrive late. If you arrive late for a quiz, test, or the final exam, instructions may not be repeated and you will not receive additional time to complete the assignment. NO MAKE-UP QUIZZES OR TESTS ARE GIVEN. It is possible to arrange to take a test or quiz early. If you are a student-athlete, away from class due to other documented college-related business, or there is a conflict with a recognized religious holiday of your faith, an accommodation will be made if arrangements are made prior to the absence. Your lowest quiz/homework grade will be dropped. Please note that an Absence Memorandum from Health Services/Undergraduate Academic Services only verifies your documentation for missing a class. It does not entitle you to make up or be excused from any work, assignment, quiz, or test. You should obtain notes from a classmate, read the associated material in the text, and then come ask questions. If you miss picking up a graded quiz or test you should pick it up from my office as expeditiously as possible.

Drop/Add  In order to change sections or change courses you must do so no later the end of the first week of class.

Accommodations  Any student eligible for accommodations because of disability must speak with the instructor during the first two weeks of class or as soon as the student has been approved for services so that these needs can be addressed. Documentation must be approved by the Center for Disability Services.

Math Competency  Competency at the level of MATH 111 or beyond, which includes algebra and graphing, is assumed. Help with math can be obtained from the CSL. You will need a calculator that can perform logarithmic and exponential functions (~$15). Bring this calculator to all class meetings. It is also expected that you have fundamental knowledge on the use of spreadsheets (Excel).

Responsibilities  You are responsible for all material covered or assigned in class or assigned electronically. You should check OAKS regularly for any updates. If no specific reading or homework assignments are made in class you should minimally read ahead at least three sections and attempt the associated in-chapter and end-of-chapter problems. It is absolutely vital that you keep current in your studies. You need to spend sufficient time between each class to understand and master the material as well as read ahead by at least three sections of the text. The instructor is to communicate expectations, explain the material, and help you to the best of his time and ability. However, the responsibility for learning is upon you, the student. Your grade is based solely on your performance in class on quizzes, tests, and the final exam. There is NO extra credit. There are no "Do-Overs." Answer keys are provided for quizzes and tests on OAKS. It is your responsibility to check your papers for grading errors. No changes for grading errors will be allowed after one week has passed from when the graded quiz or test has been returned to you.

Electronics Device Policy  The use of cell phones, smart phones, or other mobile communication devices is disruptive, and is therefore prohibited during class. Students are permitted to use computers during class for note-taking and other class-related work only; however; use of computers during class for work or pleasure not related to that class is prohibited.

Class Room Courtesy  As a college student you are in training to be a professional of some sort. The habits, attitudes, and ethics you develop now will carry over into your professional life. Be on time (be in your seat ready to start prior to the official class start time). Be on task (don't be texting, surfing the net, etc.). Be polite (respect others, especially the professor, while they are talking).

Email  Email is considered an official method for communication at the College of Charleston. If a student wishes to have email redirected from their official College-issued account to another email address (e.g., @aol.com, @hotmail.com, @yahoo.com, or any other server other than the official @cofc.edu), they may do so, but at their own risk. Having email redirected does not absolve the student from the responsibilities associated with official communication sent to his or her College account. The College is not responsible for the handling of email by outside vendors or unofficial servers. Students are expected to check their College of Charleston official email on a daily basis. Students have the responsibility to recognize that certain communications may be time-critical. "I didn't check my email", error in forwarding email, or email returned to the College with "Mailbox Full" or "User Unknown" are not acceptable excuses for missing official College communications via email.
SET 7—Chem 220 Syllabus

OAKS  OAKS is the learning Management System used by the College of Charleston. It is accessed via myofc.edu. It is where you may find the syllabus and ancillary course material that supplements the text and lecture (PowerPoint slides, answer keys, study guides, etc.). Practice quizzes and tests from previous semesters may or may not be representative of the material to be covered on a specific test due to addition/deletion of topics or reordering of the sequence of topics. You should check the “News” section at least once between every class meeting.

Student Learning Outcomes (SLOs)

1. To describe the sequence of steps of quantitative chemical analysis
2. To compute stoichiometric, concentration (e.g. molarity), titrimetric, and statistical calculations.
3. To describe explain and apply the theory behind the analytical methods studied.
4. To analyze the credibility of data and calculate estimates of experimental error.
5. To explain the basic principles, instrumentation and applications of the techniques studied. including applications to environmental and biochemical fields.

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<tbody>
<tr>
<td>SSMB 130</td>
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<td>M 1:00 - 2:00 pm *</td>
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<td>T 1:30 - 2:30 pm *</td>
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</tbody>
</table>

Quizzes  Quizzes will be given periodically at the beginning of class, and may or may not be announced in advance. There will be no make-up quizzes. I will drop the lowest quiz/homework grade. If you miss a quiz or homework assignment it is a zero, no matter what the reason. Bring a calculator to every class.

Homework  You are the person ultimately responsible for your performance in the course. There is homework associated with every class meeting this semester. Whether announced or not, minimally you should read at least the next three sections of the text and try any associated problems prior to coming to class. Problems will be assigned from the text. These are for your benefit. Some assignments may be collected and graded, most will not; however, quizzes and tests will be drawn, in large part, from these problems. It is important for you to put pencil to paper, to actually work out the problems, drawing structures, performing calculations, and naming compounds. As you work the problems seek understanding and not simply try to get the correct answer.

Tests  There will be 4 tests plus the final exam. If you know that you will miss a test for a school-sponsored event, you must contact me as soon as possible prior to that event so that other arrangements can be made. No make-up tests will be given for any reason, no exceptions. Questions from the laboratory, especially concerning lab safety will be included on each test and the final exam. Your lowest test grade will be replaced by your final exam grade if it is higher than your lowest test grade.

Extra Credit  There is none. Your performance is based solely on quizzes, homework, tests, lab, and the final exam.

Show Your Work  In order to receive credit on any graded problem you must show all work. This includes the formula that you are using, all numbers plugged into the formula, and the units that you use. You need not show all algebraic steps (but it would probably benefit you to do so).
Final Exam  The final exam is cumulative over the entire semester and covers both the lecture and lab portions of the course. It is a timed test, multiple choice test and is weighted to count 20% of your overall grade. Do *NOT* be late. If you are late you will not be given extra time to finish. You should be on campus at least 30 minutes before the start of the final and should plan on being in your seat at least 5 minutes prior to the start of the final exam. The following statement is from the Undergraduate Catalog:  
Examinations must be taken at the time scheduled except when:  
1. Two or more exams are scheduled simultaneously.  
2. The student has three or more examinations within a 24-hour period.  
Permission to reschedule one exam may be obtained from the Office of the Registrar with written permission of the instructor and must be obtained prior to the first day of the exam period.  
Failure to take the final exam will result in a grade of "X" which turns to an "F" after 48 hours.

Grading Scheme:

<table>
<thead>
<tr>
<th>Grading Scale</th>
<th>Letter Grade</th>
<th>Range</th>
<th>GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Average</td>
<td>A</td>
<td>93-100</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>A-</td>
<td>90-93</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td>B+</td>
<td>87-90</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>83-87</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>B-</td>
<td>80-83</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td>C+</td>
<td>77-80</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>73-77</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>C-</td>
<td>70-73</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>D+</td>
<td>67-70</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>63-67</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>D-</td>
<td>60-63</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>Below 60</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Lecture Sequence (Chapters to be covered)
Part 1. Introduction to Quantitative Analytical Chemistry and Statistical Handling of Data, Chapters 0, 1, 3, & 4.  
Part 2. Aqueous Chemistry. Chapters 6-12  
Part 3 Redox Chemistry. Chapters 14-15  
Part 4 Quality Assurance and Methods of Calibration, Chapter 5  
Part 5. Spectrometry and Spectrophotometry, Chapters 18-20  
Part 6. Chromatography, Chapters 21-22  
Not all topics in all chapters, nor all chapters will be covered equally. You need to come to class.  
Each chapter often builds on the preceding ones, so be sure to keep up by reading the chapter ahead of time and by doing the homework problems as soon as we cover the topics in class. Quizzes and tests will cover material from the chapters, homework, and class notes.
SET 7-CHEM 220/220L New Course Form

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco Phone: 3-5587 Email: gelascop@cofc.edu

Department or Program: CHEMISTRY School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 220/220L Fundamentals of Analytical Chemistry

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☒ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☐ Course Number
☐ Course Name
☐ Course Description
☐ Credit/Contact Hours
☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This course pair will replace CHEM 221/221L to bring it in line with new guidelines for certification by the American Chemical Society. Some content will be modernized from the existing course. The six lab hours per week are required so that graduates will meet the minimum of 400 contact laboratory hours required for a certified degree. Please note that the course currently meets for 3 contact hours of lecture and 6 contact hours of lab and this change is primarily an accounting change to reflect current practice.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

The following majors and minors will be affected: BA Chemistry, BS Chemistry, BS Marine Biology, and the Chemistry minor. This course is required of all of these programs. All of these will see one additional credit hour added as the 4+0 lecture/lab pair becomes a 3+2 credit hour pair.
SET 7-CHEM 220/220L New Course Form

EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: 
School: 
Subject Acronym: 
Course Number: 

Credit hours: ___ lecture ___ lab ___ seminar ___ independent study
Contact hours: ___ lecture ___ lab ___ seminar ___ independent study

Course title:

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Cross-listing, if any:

Is this course repeatable? ☐ yes ☐ no If yes, how many total credit hours may the student earn? __

E. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: 
School: 
Subject Acronym: 
Course Number: 

Credit hours: ___ lecture ___ lab ___ seminar ___ independent study
Contact hours: ___ lecture ___ lab ___ seminar ___ independent study

Course title: Fundamentals of Analytical Chemistry

Course description (maximum 50 words, exactly as it appears in the catalog):

CHEM 220 A study of the fundamentals of analytical chemistry with special attention given to quantitative analysis including volumetric analysis, electrochemical measurements, optical spectroscopy, chromatography, quality assurance, calibration methods, and statistical treatment of data.

CHEM 220L A laboratory program to accompany CHEM 220. Laboratory six hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Prerequisite: CHEM 112 and 112L or HONS 154 and 154L or HONS294 and 294L
Corequisite: CHEM 220L for CHEM 220
CHEM 220 for CHEM 220L

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? ☒ yes ☐ no
If so, which course? ____CHEM 221/221L_____

Note: You must deactivate that course by submitting an additional Course Form.

This form was last updated on 06/03/13 and replaces all others.
SET 7-CHEM 220/220L New Course Form
Cross-listing, if any (submit approval from relevant department):

Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☑ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? ☑ yes ☐ no What is the fee? $___125___

Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

This course is replacing CHEM 221L for which the lab fee has previously been approved.

F. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected. No changes in enrollment patterns are expected.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the course?</td>
<td>Measurement instrument: tests, quizzes, final exam</td>
</tr>
<tr>
<td>1. To describe the sequence of steps of quantitative chemical analysis</td>
<td>· Who: The students</td>
</tr>
<tr>
<td></td>
<td>· When: Periodically throughout semester</td>
</tr>
<tr>
<td></td>
<td>· Performance standard: 70% minimum correct</td>
</tr>
<tr>
<td>2. To compute stoichiometric, concentration (e.g. molarity), titrimetric, and statistical calculations.</td>
<td>Measurement instrument: tests, quizzes, final exam, lab reports</td>
</tr>
<tr>
<td></td>
<td>· Who: The students</td>
</tr>
<tr>
<td></td>
<td>· When: Periodically throughout semester</td>
</tr>
<tr>
<td></td>
<td>· Performance standard: 70% minimum correct</td>
</tr>
<tr>
<td>3. To describe explain and apply the theory behind the analytical methods studied.</td>
<td>Measurement instrument: tests, quizzes, final exam</td>
</tr>
<tr>
<td></td>
<td>· Who: The students</td>
</tr>
<tr>
<td></td>
<td>· When: Periodically throughout semester</td>
</tr>
<tr>
<td></td>
<td>· Performance standard: 70% minimum correct</td>
</tr>
<tr>
<td>4. To analyze the credibility of data and calculate estimates of experimental error.</td>
<td>Measurement instrument: tests, quizzes, final exam, lab reports</td>
</tr>
<tr>
<td></td>
<td>· Who: The students</td>
</tr>
<tr>
<td></td>
<td>· When: Periodically throughout semester</td>
</tr>
<tr>
<td></td>
<td>· Performance standard: 70% minimum correct</td>
</tr>
<tr>
<td>5. To explain the basic principles, instrumentation and applications of the techniques studied, including applications to environmental and biochemical fields.</td>
<td>Measurement instrument: tests, quizzes, final exam</td>
</tr>
<tr>
<td></td>
<td>· Who: The students</td>
</tr>
<tr>
<td></td>
<td>· When: Periodically throughout semester</td>
</tr>
<tr>
<td></td>
<td>· Performance standard: 70% minimum correct</td>
</tr>
</tbody>
</table>

This form was last updated on 06/03/13 and replaces all others.
6. To safely demonstrate appropriate quantitative laboratory techniques

<table>
<thead>
<tr>
<th>Measurement instrument: Lab reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who: The students</td>
</tr>
<tr>
<td>When: Periodically throughout semester</td>
</tr>
<tr>
<td>Performance standard: 70% minimum correct</td>
</tr>
</tbody>
</table>

7. To analyze chemical unknowns precisely and accurately

<table>
<thead>
<tr>
<th>Measurement instrument: Lab reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who: The students</td>
</tr>
<tr>
<td>When: Periodically throughout semester</td>
</tr>
<tr>
<td>Performance standard: 70% minimum correct</td>
</tr>
</tbody>
</table>

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

The American Chemical Society requires for certification that all chemistry graduates have at least one 3-hour course (or its equivalent) in the fundamentals of analytical chemistry. [Link](http://www.acs.org/content/dam/acsorg/about/governance/committees/training/acsapproved/degreeprogram/2008-acs-guidelines-for-bachelors-degree-programs.pdf)

The course is the stepping stone to the advanced course. Techniques learned in the laboratory are utilized in a variety of upper level courses such as Biochemistry lab (CHEM 354L), Physical Chemistry Lab (CHEM 341L and 342L), Chemical Synthesis & Characterization, as well as the advanced course in analytical chemistry (CHEM 520/520L).

Much of the content of the course is new while some is reinforced form the prerequisite courses.

The main SLO that will be facilitated by the addition of the new course is: Chemistry and Biochemistry majors will demonstrate proficiency in one or more of the more narrowly defined sub-disciplines of Chemistry, which include Analytical, Biochemistry, Inorganic, Organic, or Physical chemistry. This is the foundational course in analytical chemistry in our department and is critical for developing proficiency in this area of chemistry.

---

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration?  

- [ ] yes  
- [x] no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

- [x] I have completed all relevant parts of the form.
- [x] I have attached a cover letter that describes my request and lists all the documents I am submitting.
- [x] (For new courses only) I have attached a syllabus.
- [x] (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.
- [x] (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.
- [x] I have submitted one Signature Form that lists all of the different forms I am submitting.

This form was last updated on 06/03/13 and replaces all others.
SET 7—Chem 220L Syllabus  
Quantitative Analysis Laboratory  
CHEM 2201L  
SSMB 323

Co-requisite: CHEM 220. You cannot drop 220 or 220L without dropping the other.

Lab Supplies: You will need to bring the following supplies with you:
- Safety glasses or goggles
- Lab coat
- Composition book to serve as laboratory notebook
- Ballpoint pen, black preferred for all lab notebook recording
- Box of nitrile gloves (at least 50 gloves per box is recommended)

You can leave all of your lab attire in Room 323, if you prefer. There are cubbies and drawers available for you to use this semester.

Laboratory Procedures: You can find the lab procedures and report sheets on the class website:  
http://coryw.people.cofc.edu/CHEM_220/lab.html

It is your responsibility to print the week’s procedure, read it, and complete all preparations contained in the procedure. Preparing yourself before class is critical to completing each exercise in a timely manner. Each student is to work independently on the laboratory exercises. Exceptions are instrumental procedures toward the end of the semester when group exercises are conducted.

Always remember, Safety First!

If you do not have the appropriate safety gear, you will not be allowed to work in the lab.

No exceptions.

Safety Gear
- You must wear your safety glasses or goggles at all times in the lab.
- Long pants are required. You can keep a pair in your lab drawer if you choose.
- Long sleeves are required to provide full coverage of your arms.
- Lab coats are required to ensure full coverage and protect your clothes.
- Nitrile gloves must be worn when working with solutions and other reagents.
- Footwear must provide adequate protection to the entire foot. Sandals, open toe shoes, mesh top shoes and shoes with extremely high or narrow heels are inappropriate for the laboratory and will not be permitted.
- You are advised to tie back long hair.

Lab stations and glassware
Each student will be assigned a laboratory drawer containing glassware and other tools needed to perform the lab exercises. Each student is responsible for the contents of their assigned drawer, for returning all glassware (clean) and tools at the end of each lab period to the appropriate drawer. The assigned work area, the balance area, and the area where reagents are kept are to be kept neat and clean. All spills are to be cleaned up immediately.

Lab Notebook
A laboratory notebook should provide a full record of what was performed during the experiment. Most importantly, all data must be recorded in your notebook as soon as it is generated. For more information on keeping a laboratory notebook, see the link on our class website. Your laboratory instructor will check, initial and date your notebook data at the end of each experiment to ensure that it is properly recorded and that you have all the information you need to calculate results. All calculations should be shown in the laboratory notebook such that the instructor may follow your logic and check for calculation errors. Each student is expected to observe the College of Charleston Policy on Scientific Integrity.

Results Submission
Results are due before the end of the week on a report sheet that can be found on the website.
SET 7—Chem 220L Syllabus

Grading Policy
In quant lab, you are graded on the accuracy of your quantitative results. Your laboratory technique and skill will determine how accurate your results will be. Your experimental results for each unknown will be compared to the actual results. Your grade will be calculated based upon the difference between the two. The lowest grade you can receive for a completed laboratory exercise is 65. Results that are incorrect due to calculation error may be re-submitted for a grade, with a loss of 5 points. Results are due at the start of the following week. Your final result should always be clearly labeled on the report sheet with the correct number of significant figures.

Your lab grade will be determined as an average of all lab report grades. There are no lab quizzes, midterm or final.

Attendance Policy
You are expected to attend all laboratory meetings. You are responsible for completing all assigned labs before the final exam. No exceptions.

Student Learning Outcomes
1. To perform quantitative analytical methods including titrations, pH measurements, spectrophotometry, and chromatography.
2. To demonstrate quantitative laboratory skills capable of obtaining precise and accurate results.
3. To properly communicate those results using appropriate calculations, statistical analyses, significant figures, and units.
4. To demonstrate proper use of volumetric glassware including buret, pipet, and volumetric flask.
5. To assess the credibility of data obtained in the laboratory.
6. To keep a good laboratory notebook.

Grading Scheme

<table>
<thead>
<tr>
<th>Letter</th>
<th>Number</th>
<th>GP</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
<td>4.0</td>
</tr>
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<td>83-86</td>
<td>3.0</td>
</tr>
<tr>
<td>B-</td>
<td>80-82</td>
<td>2.7</td>
</tr>
<tr>
<td>C+</td>
<td>77-79</td>
<td>2.3</td>
</tr>
<tr>
<td>C</td>
<td>73-76</td>
<td>2.0</td>
</tr>
<tr>
<td>C-</td>
<td>70-72</td>
<td>1.7</td>
</tr>
<tr>
<td>D</td>
<td>65-69</td>
<td>1.0</td>
</tr>
<tr>
<td>F</td>
<td>Below 65</td>
<td>0.0</td>
</tr>
</tbody>
</table>
SET 7-CHEM 221/221L Deactivation Form

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco
Phone: 3-5587
Email: gelascop@cofc.eu

Department or Program: CHEMISTRY
School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 221/221L Fundamentals of Analytical Chemistry

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☐ Course Number
☐ Course Name
☐ Course Description
☐ Credit/Contact Hours
☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☒ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This course pair will be replaced by CHEM 220/220L to bring it in line with new guidelines for certification by the American Chemical Society.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

The following majors and minors will be affected: BA Chemistry, BS Chemistry, BS Marine Biology, and the Chemistry minor. This course is required of all of these programs. All of these will see one additional credit hour added as the 4+0 lecture/lab pair becomes a 3+2 credit hour pair (BA Chem: 32 to 33 hours, BS Chem: 56 to 57 hours, BS Biochem: 72 to 73 hours, Chemistry minor: 23 to 24 hours).

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

This form was last updated on 06/03/13 and replaces all others.
SET 7-CHEM 221/221L Deactivation Form
Department: Chem & Biochem School: SSM Subject Acronym: CHEM Course Number: 221/221L

Credit hours: _4_ lecture _0_ lab _2_ seminar _6_ independent study
Contact hours: _3_ lecture _6_ lab _2_ seminar _6_ independent study

Course title: Quantitative Analysis

Course description (maximum 50 words, exactly as it appears in the catalog):

A study of the fundamentals of quantitative analysis. Special attention is given to equilibria involving acids, bases, precipitates, complex ions and oxidizing and reducing agents. In the laboratory, an opportunity is provided for solving problems in gravimetric and volumetric analysis, along with an introduction to the use of instruments for chemical analysis. Lecture two hours per week; laboratory six hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Prerequisites: CHEM 112, 112L.
Corequisites: CHEM 221 for 221L; CHEM 221L for 221

Cross-listing, if any:

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? ___

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use **boldface** for the information that is changing.

Department: School: Subject Acronym: Course Number:

Credit hours: _4_ lecture _2_ lab _2_ seminar _0_ independent study
Contact hours: _3_ lecture _6_ lab _2_ seminar _6_ independent study

Course title: Fundamentals of Analytical Chemistry

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):
If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? ☐ yes ☐ no
If so, which course? _______
Note: You must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department):
Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☐ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? ☐ yes ☐ no What is the fee? $___
Note: The Senate cannot approve new fees. Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

This form was last updated on 06/03/13 and replaces all others.
H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the course?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
</tbody>
</table>

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☒ yes ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☒ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☒ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 8-CHEM 421 New Course Form

FACULTY CURRICULUM COMMITTEE COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco Phone: 3-5587 Email: gelascop@cofc.edu

Department or Program: CHEMISTRY School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 421/421L Instrumental Methods of Analysis

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
  ☐ Course Number
  ☐ Course Name
  ☐ Course Description
  ☐ Credit/Contact Hours
  ☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This request is to create CHEM 421, and accompanying corequisite lab course (CHEM 421L), replacing CHEM 521/521L. Currently CHEM 521/521L is awarded 4 credit hours for CHEM 521 and 0 for 521L. The proposed change to 3+1 would bring it in line with other courses in the department.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

The only major that will be affected is BS Chemistry. This course is required of this program. No other majors will be affected.

EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

• Department: School: Subject Acronym: Course Number:

This form was last updated on 06/03/13 and replaces all others.
SET 8-CHEM 421 New Course Form

Credit hours:  __ lecture  ___ lab  ___ seminar  ___ independent study
Contact hours:  __ lecture  ___ lab  ___ seminar  ___ independent study

Course title:  

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Prerequisite:  
Corequisite:  

Cross-listing, if any:  

Is this course repeatable?  □ yes  □ no  If yes, how many total credit hours may the student earn?  ____

E. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use **boldface** for the information that is changing.

Department:  
School:  
Subject Acronym:  
Course Number:  

Credit hours:  ___ lecture  ____ lab  ___ seminar  ___ independent study
Contact hours:  ___ lecture  ___ lab  __ seminar  ___ independent study

Course title:  **CHEM 421** Instrumental Methods of Analysis
**CHEM 421L** Instrumental Lab

Course description (maximum 50 words, exactly as it appears in the catalog):

**CHEM 421** The **ory and principles underlying the techniques of modern analytical chemistry. Topics include qualitative and quantitative analysis using chromatographic, spectrophotometric, electroanalytical, magnetic resonance, radiochemical and other selected instrumental techniques. Lectures three hours per week.

**CHEM 421L** A laboratory program to accompany CHEM 520. Laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Prerequisite:  CHEM 220 and 220L (new numbering)
Corequisite:  CHEM 421L for CHEM 421
CHEM 421 for CHEM 421L

If this is a newly-created course, is it intended to be the equivalent of an existing course?  □ yes  □ no
If so, which course? CHEM 521/CHEM521L

If equivalent, will the newly-created course replace the existing course?  □ yes  □ no

Note: If yes, you must deactivate that course by submitting an additional Course Form.
SET 8-CHEM 421 New Course Form

Cross-listing, if any (submit approval from relevant department):
Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? ___.

Is there an activity, lab, or other fee associated with this course? ☒ yes ☐ no What is the fee? $125
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

The fee for the existing course CHEM 521L, now being replaced with CHEM 421L, has already been approved by the Board of Trustees.

F. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
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<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
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1. To demonstrate a fundamental understanding of the theoretical basis of measurements (electronics, signal processing, electrochemistry, spectroscopy, and chromatography) and the the dependence of measurements on atomic, ionic, and molecular properties

   Measurement instrument: tests, quizzes, final exam
   Who: All students
   When: Periodically throughout semester
   Performance standard: 70% minimum correct

2. To select and apply an appropriate instrumental method of analysis to chemistry problems in any of the sciences

   Measurement instrument: tests, quizzes, final exam
   Who: All students
   When: Periodically throughout semester
   Performance standard: 70% minimum correct

3. To demonstrate a practical knowledge of how to perform meaningful interpretation of data from analytical chemical measurement including the limitations of the technique.

   Measurement instrument: tests, quizzes, final exam
   Who: All students
   When: Periodically throughout semester
   Performance standard: 70% minimum correct

4. To safely demonstrate appropriate laboratory techniques

   Measurement instrument: Lab reports
   Who: All students
   When: Periodically throughout semester
   Performance standard: 70% minimum correct

This form was last updated on 06/03/13 and replaces all others.
5. To analyze the credibility of data and calculate estimates of experimental error.

| Measurement instrument: tests, quizzes, final exam, lab reports  
| Who: All students  
| When: Periodically throughout semester  
| Performance standard: 70% minimum correct |

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

The main SLO that will be facilitated by the addition of the new course is: Chemistry and Biochemistry majors will demonstrate proficiency in one or more of the more narrowly defined sub-disciplines of Chemistry, which include Analytical, Biochemistry, Inorganic, Organic, or Physical chemistry. This is the advanced course in analytical chemistry in our department and is critical for developing proficiency in this area of chemistry.

This course provides advanced knowledge in the area of analytical chemistry. 

http://www.acs.org/content/dam/acsorg/about/governance/committees/training/acsapproved/degreeprogram/2008-accs-guidelines-for-bachelors-degree-programs.pdf

Much of the content of the course is new while some is reinforced form the prerequisite courses.

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☒ yes ☐ no

_____ BS Chemistry major will be changed.

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ 1 have completed all relevant parts of the form.

☒ 1 have attached a cover letter that describes my request and lists all the documents I am submitting.

☒ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.

This form was last updated on 06/03/13 and replaces all others.
SET 8: CHEM 421 Syllabus

CHEM 421 Instrumental Methods of Analysis  Fall 2014  SSMB 125
Dr. Wendy Cory, SSMB 314  coryw@cofc.edu  843-953-1405
M,W,F, 11:00am – 11:50am

Office Hours: Monday 1-2, Tuesday 9-11, or by appointment

Class notes and other info will be posted to our OAKS website throughout the semester.

Course Materials  Principles of Instrumental Analysis, 6th edition, by Skoog, Holler and Crouch
Co-requisite  CHEM 421L

Course Introduction
The focus of this course is on the principles of electronics, spectroscopy, mass spectrometry, and chromatography. We will focus on how we utilize chemical phenomena to make analytical measurements, both qualitatively and quantitatively, and how these concepts are implemented using the current instrumentation available in our laboratories. These principles are constant and should provide an insight both into how modern instruments work now as well as the basis for understanding how they will work a decade from now. We will pay close attention to the samples and analytes to which these methods are applicable and how best to obtain the chemical information needed to solve analytical problems using instrumental methods. In order to choose the best instrumental method for addressing an analytical problem, we will consider:

- the property or quantity of the chemical system to be measured
- the physical and chemical principles upon which the measurement is based
- the generation of a signal by a suitable detector (transducer) and the processing of the signal to convert it to a form appropriate for a readable device
- how the instrument actually makes the measurement
- some of the techniques used to improve analytical figures of merit (such as accuracy, precision, and sensitivity)
- the strengths and limitations of each particular instrumental method or approach
- how to take data from the instrument and incorporate it into a written report that effectively communicates the analytical results

You will develop an understanding of the analytical capabilities of a number of instrumental methods and should be able to suggest suitable instrumental methods to solve particular analytical problems. A key component of the course will be writing analysis reports that effectively communicate your results.

Student Learning Outcomes
1. To demonstrate a fundamental understanding of the theoretical basis of measurements (electronics, signal processing, electrochemistry, spectroscopy, and chromatography) and the dependence of measurements on atomic, ionic, and molecular properties
2. To select and apply an appropriate instrumental method of analysis to chemistry problems in any of the sciences
3. To demonstrate a practical knowledge of how to perform meaningful interpretation of data from analytical chemical measurement including the limitations of the technique.

E-mail
I communicate with the class using email. It is your responsibility to make sure that I have a correct email address for you; it is your responsibility to read your g.cofc.edu email.

Attendance
Do not miss class. If you choose to miss class, it is your responsibility to find a classmate who will share their notes with you.

Homework
SET 8: CHEM 421 Syllabus

Problems from the book will be assigned for each topic we cover; it is recommended you do all homework problems, as exams will be drawn in part from these types of problems. Homework assignments will not be graded.

Quizzes
Quizzes will be given periodically and will be announced one class in advance. There will be no make-up quizzes. One quiz may be dropped with an Absence Memo from the Associate Dean of Students. No more will be dropped for any circumstances, no exceptions. Occasionally take-home quizzes will be assigned; you are expected to do your own work and adhere to the College’s Honor Code.

Tests
There will be 4 tests plus the final exam; see schedule on next page of syllabus. If you know that you will miss a test for a school-sponsored event, you must contact me as soon as possible (leave a voicemail or e-mail) so that you can take the test early. No make up tests will be given for any reason, no exceptions. One test may be replaced with your final exam grade if you miss due to illness or a family emergency (with an Absence Memo from the Dean.) No more will be dropped for any circumstances, no exceptions.

Final Exam
The final exam is cumulative over the entire semester and is a timed (100 minute) American Chemical Society Standardized test. It is weighted to count 20% of your overall grade. Do "NOT" be late. You should be on campus at least 30 minutes before the start of the final and should plan on being in your seat at least 5 minutes prior to the start of the final exam.

Laboratory
CHEM 421 and 421L are co-requisite courses. You must be enrolled in both lab and lecture.

Electronic Device Policy
The use of any wireless communication device during a quiz, test, or final exam is prohibited and will be considered a violation of the Honor Code. You will not be allowed to use it as a calculator, even if you forget your calculator. Cell phones must be turned off or on "silent" ring.

<table>
<thead>
<tr>
<th>Grading Scheme:</th>
<th>Test Average 35%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Quizzes 10%</td>
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<tr>
<td></td>
<td>Final Exam 20%</td>
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<tr>
<td></td>
<td>Laboratory 35%</td>
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<tr>
<td></td>
<td>100%</td>
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<tr>
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<td>83-86</td>
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<tr>
<td>B-</td>
<td>80-82</td>
<td>2.7</td>
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<tr>
<td>C+</td>
<td>77-79</td>
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<td>73-76</td>
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</tr>
<tr>
<td>C-</td>
<td>70-72</td>
<td>1.7</td>
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<tr>
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<td>65-69</td>
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<td>F</td>
<td>Below 65</td>
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Class Schedule

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<th>Date</th>
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<tbody>
<tr>
<td>Test 1</td>
<td>F September 12</td>
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<tr>
<td>Test 2</td>
<td>M October 6</td>
</tr>
<tr>
<td>Test 3</td>
<td>F October 31</td>
</tr>
<tr>
<td>Test 4</td>
<td>M November 24</td>
</tr>
<tr>
<td>Final exam</td>
<td>W December 3, 9:00 – 10:50, SSMB 125</td>
</tr>
</tbody>
</table>
Course Topics

Electrical Components, Circuits and Noise (Chapters 1-5)
- Conductors and Semiconductors
- Direct Current Circuits
- Ohms Law
- Resistors, Diodes, Capacitors, Inductors, LEDs, power supplies
- Signal-to-Noise Ratio
- Sources of noise

Introduction to Spectrometric Instrumentation Components (Chapters 6 & 7)
- EM radiation review
- Light Sources
- Lasers
- Wavelength selectors
- Sample containers
- Radiation transducers
- Grating Equation
- Fourier transform
- Fiber optics

Atomic Spectrometric Methods – Instrumentation, Applications, some Theory (Chapters 8-12)
- Atomic Emission Spectroscopy – flame, plasma
- Atomic Absorption Spectroscopy – flame, graphite furnace
- Atomic Fluorescence Spectroscopy
- Atomic Mass Spectrometry – ICP-MS
- Atomic X-Ray Spectroscopy

Molecular Spectrometric Methods – Instrumentation, Applications, some Theory (Chapters 13-20)
- UV-Visible Spectroscopy
- Fluorimetry
- Phosphorimetry
- Chemiluminescence and Bioluminescence
- Infrared Spectrometry
- Raman Spectroscopy
- NMR
- Molecular Mass spectrometry
- Ionization methods in MS – EI, CI, FAB, MALDI, ESI

Separation Methods – Instrumentation, Applications, some Theory (Chapters 26-30)
- Gas Chromatography
- Liquid Chromatography
- Ion Chromatography
- Size Exclusion Chromatography
- Capillary Electrophoresis

Electroanalytical Methods – Instrumentation, Applications, some Theory (Chapters 22-25)
- Ion Selective Electrodes
- Potentiometry
- Coulometry
- Voltammetry
Chem 421L Instrumental Analysis Lab

Dr. Wendy Cory, SSMB 314
Tuesday 1:40-4:40
Wednesday 2:00-5:00

Instrumental Analysis lab meets in Room 321 of the New Science Building (SSMB). You will need to bring the following supplies with you:
- Safety glasses or goggles
- Lab Coat
- Nitrile Gloves (not latex)
- Composition book to serve as laboratory notebook
- Ballpoint pen, black preferred for all lab notebook recording

Chem 421 lecture is a co-requisite for this course. You cannot drop one without dropping the other.

Always remember, Safety First!

If you do not have the appropriate safety gear, you will not be allowed to work in the lab. No exceptions.

Safety Gear
- You must wear your safety glasses or goggles at all times in the lab.
- Long pants are required. You can keep a pair in your lab drawer if you choose.
- Footwear must provide adequate protection to the entire foot. Sandals, open toe shoes, mesh top shoes and shoes with extremely high or narrow heels are considered inappropriate for laboratory conditions and will not be permitted.
- You are advised to tie back long hair and wear shirts that offer full coverage.
- Lab coats are required to cover your arms and protect your clothes.
- Nitrile gloves must be worn when working with solutions and other reagents.

Lab Notebook
A laboratory notebook should provide a full record of what was performed during the experiment. Most importantly, all data must be recorded in your notebook as soon as it is generated. Your laboratory instructor will check, initial and date your notebook data at the end of each experiment to ensure that it is properly recorded and that you have all the information you need to write your reports. All calculations should be shown in the laboratory notebook such that the instructor may follow your logic and check for calculation errors. Each student is expected to observe the College of Charleston Policy on Scientific Integrity.

Reports Submission
Reports are due the week following the experiment. Ten points will be deducted for every week that the report is late.

Grading Policy
Your lab grade will be determined as an average of all lab report grades. There are no lab quizzes, midterm or final.

Attendance Policy
You are expected to attend all laboratory meetings. You are responsible for completing all assigned labs. No exceptions.
Lab Reports
Your grade on the laboratory report will be based on the results obtained including analysis of unknown samples, a demonstration of an understanding of the procedure, and the effectiveness of communicating what you did. Organization and presentation of results will certainly be a factor. All write-ups exclusive of the data analysis must represent an individual effort. This means that copying of reports with cosmetic alterations of the language will result in a grade of F for both submitters. Cases involving wholesale submission of identical reports will be submitted to the Honor Board pursuant to the College of Charleston Honor Code.

Your lab reports should include the following sections:

Title
Author’s name
Partner's name(s)

Abstract (also called Executive Summary)
1. Introduction – describe the problem this experiment was designed to solve or the principle it was designed to illustrate.
2. Materials and Methods – all of the materials and instrumentation that you used in your experiment goes in this section, as well as explanation of how you did things (e.g. “The sample was sonicated for 5 minutes, centrifuged at 4400 rpm for 15 minutes, and the supernatant transferred into an HPLC vial for analysis.”)
3. Results and Discussion – your data (tables, graphs, etc.) goes in this section, along with descriptions and/or statements about what the data means.

Your lab report will be graded on both content and presentation. Your graphs should look clean, non-cluttered, and clearly present the relationship that the data is illustrating. When photos are used as figures, they should be scaled in a way that the important details can be seen, but not so large that you’re wasting ink and space. Spelling, grammar, and significant figures must all be correct for full credit.
SET 8-CHEM 521/521L Deactivation Form

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco  Phone: 3-5587  Email: gelascp@cofc.eu

Department or Program: CHEMISTRY  School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 521

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
  ☐ Course Number
  ☐ Course Name
  ☐ Course Description
  ☐ Credit/Contact Hours
  ☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☒ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This pair of co-requisite courses CHEM 521/521L are to be replace by CHEM 421/421L. Currently, the credit hour for CHEM 521L is counted toward CHEM 521 for a total of 4 credit hours. Only one grade is calculated for both courses. Students will now earn separate credit for the lecture and lab whereas now they earn a grade for both combined. This will make the course more like most other courses in the department.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

The only major that will be affected is BS Chemistry. This course is required of this program.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: Chemistry  School: SSM  Subject Acronym: CHEM  Course Number: 521

This form was last updated on 06/03/13 and replaces all others.
SET 8-CHEM 521/521L Deactivation Form

Credit hours: 3 lecture _1_ lab _2_ seminar _1_ independent study
Contact hours: 3 lecture _3_ lab _2_ seminar _1_ independent study

Course title: Instrumental Analysis

Course description (maximum 50 words, exactly as it appears in the catalog):

Theory and principles underlying the techniques of modern analytical chemistry. Topics include qualitative and quantitative analysis using chromatographic, spectrophotometric, electroanalytical, magnetic resonance, radiochemical and other selected instrumental techniques. Lectures three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Prerequisite: CHEM 221 and CHEM 221L (old numbering)

Cross-listing, if any:

Is this course repeatable? □ yes ☒ no If yes, how many total credit hours may the student earn? ___

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use **boldface** for the information that is changing.

Department:  School:  Subject Acronym:  Course Number:

Credit hours:  _2_ lecture _1_ lab _2_ seminar _1_ independent study
Contact hours:  _2_ lecture _1_ lab _2_ seminar _1_ independent study

Course title:

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? □ yes □ no If so, which course? __________

*Note: You must deactivate that course by submitting an additional Course Form.*

Cross-listing, if any (submit approval from relevant department):

Note: Cross-listed courses are equivalent.

Is this course repeatable? □ yes □ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? □ yes □ no What is the fee? $_____

*Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.*

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected.
H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
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<tr>
<td>3.</td>
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<td>4.</td>
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How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? □ yes □ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.
1. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration?  
☐ yes  ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
## Set 14-Biochemistry Credit Hour and Lab Contact Hour Count Before and After Changes

<table>
<thead>
<tr>
<th>Courses</th>
<th>Required Lab Hrs</th>
<th>Required Credit Hrs</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
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<td>Current</td>
<td>Proposed</td>
<td>Current</td>
</tr>
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<td>4</td>
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<tr>
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</tr>
<tr>
<td>342/L Pchem II---Quantum</td>
<td>36</td>
<td>36</td>
<td>4</td>
</tr>
<tr>
<td>351 Biochem I---survey</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>354L Biochem Lab</td>
<td>36</td>
<td>36</td>
<td>1</td>
</tr>
<tr>
<td>352 Biochem II--metabolism</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>490 Senior Seminar I</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>492 Senior Seminar II</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>511 Inorganic</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Bio 111/L,112/L, Math 120/220, Phys 111/L,112/L</td>
<td>0</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>300 level biology elective</td>
<td>36</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Bio 312/L Molec Biol</td>
<td>36</td>
<td>36</td>
<td>4</td>
</tr>
<tr>
<td><strong>SUB-TOTAL</strong></td>
<td><strong>324</strong></td>
<td><strong>288</strong></td>
<td><strong>72</strong></td>
</tr>
</tbody>
</table>

**Students will select 2 courses from the following lab courses such that they earn 3 lab credit hours:**

<table>
<thead>
<tr>
<th>Courses</th>
<th>Required Lab Hrs</th>
<th>Required Credit Hrs</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>355 Biochem Research Methods</td>
<td>0</td>
<td>72</td>
<td>0</td>
</tr>
<tr>
<td>371 Chemical Synthesis and Characterization</td>
<td>0</td>
<td>72</td>
<td>0</td>
</tr>
<tr>
<td>481 Introductory Research I</td>
<td>0</td>
<td>72</td>
<td>0</td>
</tr>
<tr>
<td>482 Introductory Research II</td>
<td>0</td>
<td>72</td>
<td>0</td>
</tr>
<tr>
<td>312L Advanced Inorganic Lab</td>
<td>0</td>
<td>36</td>
<td>0</td>
</tr>
<tr>
<td>421L Instrumental Analysis Lab</td>
<td>0</td>
<td>36</td>
<td>0</td>
</tr>
<tr>
<td>422L Environmental Lab</td>
<td>0</td>
<td>36</td>
<td>0</td>
</tr>
</tbody>
</table>

**Students will select 1 additional lecture course from the following elective courses:**

<table>
<thead>
<tr>
<th>Courses</th>
<th>Required Lab Hrs</th>
<th>Required Credit Hrs</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>353 Chemical Biology</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>356 Biochemical Basis of Disease</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>421 Instrumental</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>422 Environmental</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>431 Advanced Organic</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**TOTAL**                                      | **324**          | **396-432**         | **72**                                        |

**75-78**
J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 9: Deactivation Form, CHEM 531

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco
Phone: 3-5587
Email: gelascope@cofc.edu

Department or Program: CHEMISTRY
School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 531
Advanced Organic Chemistry

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☐ Course Number
☐ Course Name
☐ Course Description
☐ Credit/Contact Hours
☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☒ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This is an undergraduate course and the course number change is being made at the request of the Registrar’s office.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

No impact expected.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: CHEM School: SSM
Subject Acronym: CHEM
Course Number: 531

Credit hours: 3 lecture credit hours

This form was last updated on 06/03/13 and replaces all others.
SET 9: Deactivation Form, CHEM 531

Course title: Advanced Organic Chemistry

Course description (maximum 50 words, exactly as it appears in the catalog):

The major concepts of organic chemistry are reviewed along with a review of relevant material already presented in introductory organic chemistry courses. Special topics may include heterocycles, organic polymers, organic reaction mechanisms, spectral utilization, synthesis methodology, the utilization of molecular orbitals and orbital symmetry for certain organic reactions. Lectures three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Chem 232

Cross-listing, if any:

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? 6

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use **boldface** for the information that is changing.

Department: School: Subject Acronym: Course Number:

Credit hours:
Contact hours:

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? ☐ yes ☐ no
If so, which course?

Note: You must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department):

Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☐ no If yes, how many total credit hours may the student earn? ____

Is there an activity, lab, or other fee associated with this course? ☐ yes ☐ no What is the fee?

Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

This form was last updated on 06/03/13 and replaces all others.
G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected. No changes in enrollment patterns are expected.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the course?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
</tbody>
</table>

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☑ yes  ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☑ I have completed all relevant parts of the form.

☑ I have attached a cover letter that describes my request and lists all the documents I am submitting.
☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 9: Change Course Form, CHEM 531 to 431

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco      Phone: 3-5587      Email: gelascop@cofc.edu

Department or Program: CHEMISTRY  School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 531
Advanced Organic Chemistry

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☒ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
  □ Course Number
  □ Course Name
  □ Course Description
  □ Credit/Contact Hours
  □ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This is an undergraduate course and the course number change is being made at the request of the Registrar’s office.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

No impact expected.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: CHEM School: SSM    Subject Acronym: CHEM    Course Number: 531

Credit hours: 3 lecture credit hours

This form was last updated on 06/03/13 and replaces all others.
SET 9: Change Course Form, CHEM 531 to 431

Contact hours: 3 lecture contact hours

Course title: Advanced Organic Chemistry

Course description (maximum 50 words, exactly as it appears in the catalog):

The major concepts of organic chemistry are reviewed along with a review of relevant material already presented in introductory organic chemistry courses. Special topics may include heterocycles, organic polymers, organic reaction mechanisms, spectral utilization, synthesis methodology, the utilization of molecular orbitals and orbital symmetry for certain organic reactions. Lectures three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Chem 232

Cross-listing, if any:

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? 6

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: Chemistry School: SSMSM Subject Acronym: CHEM Course Number: 531

Credit hours: 3 lecture contact hours
Contact hours: 3 lecture contact hours

Course title: Advanced Organic Chemistry
Course description (maximum 50 words, exactly as it appears in the catalog):

CHEM 531 The major concepts of organic chemistry are reviewed along with a review of relevant material already presented in introductory organic chemistry courses. Special topics may include heterocycles, organic polymers, organic reaction mechanisms, spectral utilization, synthesis methodology, the utilization of molecular orbitals and orbital symmetry for certain organic reactions. Lectures three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Chem 232

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? ☐ yes ☒ no
If so, which course? 531
Note: You must deactivate that course by submitting an additional Course Form.

NOTE: This is not a newly created course, but the changed course will replace a course and we are submitting a separate deactivation form for Chem 531

This form was last updated on 06/03/13 and replaces all others.
SET 9: Change Course Form, CHEM 531 to 431

Cross-listing, if any (submit approval from relevant department):
Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? ☐ yes ☐ no What is the fee?
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected. No changes in enrollment patterns are expected.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
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<th>Student Learning Outcomes</th>
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<tr>
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</tr>
</tbody>
</table>

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?
I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☒ yes ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 10: Deactivation Form, CHEM 541

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco  Phone: 3-5587  Email: gelascop@cofc.edu

Department or Program: CHEMISTRY  School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 541
Advanced Physical Chemistry

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☐ Course Number
☐ Course Name
☐ Course Description
☐ Credit/Contact Hours
☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☒ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This is an undergraduate course and the course number change is being made at the request of the Registrar's office.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

No impact expected.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: CHEM School: SSM  Subject Acronym: CHEM  Course Number: 541

Credit hours: 3 lecture credit hours

This form was last updated on 06/03/13 and replaces all others.
SET 10: Deactivation Form, CHEM 541
Contact hours: 3 lecture contact hours

Course title: Advanced Physical Chemistry

Course description (maximum 50 words, exactly as it appears in the catalog):

The major concepts of organic chemistry are reviewed along with a review of relevant material already presented in introductory organic chemistry courses. Special topics may include heterocycles, organic polymers, organic reaction mechanisms, spectral utilization, synthesis methodology, the utilization of molecular orbitals and orbital symmetry for certain organic reactions. Lectures three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Chem 342

Cross-listing, if any:

Is this course repeatable? □ yes □ no If yes, how many total credit hours may the student earn? 6

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: School: Subject Acronym: Course Number:

Credit hours: Contact hours:

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? □ yes □ no
If so, which course?
Note: You must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department):
Note: Cross-listed courses are equivalent.

Is this course repeatable? □ yes □ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? □ yes □ no What is the fee?
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.
G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected. No changes in enrollment patterns are expected.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
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<tr>
<td>What will students know and be able to do when they complete the course?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
</tbody>
</table>

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? □ yes □ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

This form was last updated on 06/03/13 and replaces all others.
SET 10: Deactivation Form, CHEM 541

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 10: Change Course Form, CHEM 541 to 441

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco       Phone: 3-5587       Email: gelascop@cofc.edu

Department or Program: CHEMISTRY School: Sciences & Mathematics

Subject Acronym and Course Number: CHEM 541
Advanced Organic Chemistry

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☒ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☐ Course Number
☐ Course Name
☐ Course Description
☐ Credit/Contact Hours
☒ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

This is an undergraduate course and the course number change is being made at the request of the Registrar’s office. Prerequisite is made more specific so that it is clear that the full year of physical chemistry (341/342) is required as a pre-req.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

No impact expected.

E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: CHEM School: SSM       Subject Acronym: CHEM Course Number: 541

This form was last updated on 06/03/13 and replaces all others.
SET 10: Change Course Form, CHEM 541 to 441

Credit hours: 3 lecture credit hours
Contact hours: 3 lecture contact hours

Course title: **Advanced Physical Chemistry**

Course description (maximum 50 words, exactly as it appears in the catalog):

A supplemental course to Chem 341 and 342 dealing primarily with molecular structure and bonding and with statistical thermodynamics.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Chem 342

Cross-listing, if any:

Is this course repeatable? □ yes  ☒ no  If yes, how many total credit hours may the student earn? 6

F. **NEW COURSE INFORMATION.** If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use **boldface** for the information that is changing.

Department: Chemistry  School: SSM  Subject Acronym: CHEM  Course Number: 441

Credit hours: __3__ lecture credit hours
Contact hours: __3__ lecture contact hours

Course title: Advanced Organic Chemistry
Course description (maximum 50 words, exactly as it appears in the catalog):

**CHEM 441** A supplemental course to Chem 341 and 342 dealing primarily with molecular structure and bonding and with statistical thermodynamics.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Chem 541 and 342

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? □ yes  □ no
If so, which course? 541

Note: You must deactivate that course by submitting an additional Course Form.

**NOTE:** This is not a newly created course, but the changed course will replace a course and we are submitting a separate deactivation form for Chem 541

Cross-listing, if any (submit approval from relevant department):

Note: Cross-listed courses are equivalent.

Is this course repeatable? □ yes  ☒ no  If yes, how many total credit hours may the student earn? 

Is there an activity, lab, or other fee associated with this course? □ yes  ☒ no  What is the fee?

---

This form was last updated on 06/03/13 and replaces all others.
SET 10: Change Course Form, CHEM 541 to 441

Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

There will be no change in costs. Teaching loads will not be affected. No changes in enrollment patterns are expected.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☐ yes ☒ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

This form was last updated on 06/03/13 and replaces all others.
J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
November 23, 2013

To: Jason Howell
From: Pamela Riggs-Gelasco
RE: Development of new math course

Dear Jason,

Thank you for your assistance in designing and proposing a new math course “Vector Calculus with Chemical Applications”. Using this course to replace our current Calculus II requirement for our majors will better serve our students by giving them the mathematical skillset needed to comprehend material in the Chemistry 341-342 year-long sequence of Physical Chemistry. A committee of 6 mathematicians and 4 chemists outlined the math required for Physical Chemistry and discussed multiple delivery options, including an elective course, an additional course taken after Calc II, or a simple addition of Calc III to our requirements. In subsequent discussions at Chemistry faculty meetings, we determined that an additional course on top of calculus II would be prohibitively difficult for our students and would likely affect the number of majors in our program. An elective course would not be taken by enough students to justify the workload and would further amplify differences in math skill sets. The elective course option would not allow us to fundamentally change the current method of content delivery in Physical Chemistry. Thus, we decided on a single, intense 5-credit experience that would allow both a redistribution of calculus topics presented to the students (with the bulk of these topics coming from traditional Calc III content) and the introduction of basic differential equations and linear algebra skills. We greatly appreciate the math department’s enthusiasm for both developing and teaching this course for our students.

Many thanks,

Pamela Riggs-Gelasco
SET 11-New course form Math 229

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name:    Jason Howell          Phone:    953-1016          Email:    howelljs@cofc.edu

Department or Program: Mathematics    School:    Science and Mathematics

Subject Acronym and Course Number: MATH 229

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☒ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☐ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☐ Course Number
☐ Course Name
☐ Course Description
☐ Credit/Contact Hours
☐ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

(Provided by the Department of Chemistry) The Department of Chemistry and Biochemistry requires a year-long sequence of Physical Chemistry for both its Chemistry and Biochemistry Majors. These courses are very mathematical and involve elements of multivariate calculus, linear algebra, and differential equations at a minimum. Currently, Chem and Biochem majors are required to take two semesters of calculus, Math 120 and Math 220, as prerequisites for the physical chemistry sequence, though we strongly recommend in the catalog that students also take Calculus III, Math 221. Most students do not take Calculus III, however, because both of our majors are very credit hour intensive. This leaves our physical chemistry staff having to explain complex math on top of complex chemical concepts as the material arises. The “math issue” has been a frequent topic in our department for years, and over the past four years, we have monitored the number of times our graduates refer to the “physical chemistry math problem” in our required senior exit survey. Table 1 below summarizes comments from these surveys and hint at the frustration our majors feel at not being adequately prepared mathematically for this important course sequence. In conversations with the math department, we have dissected the math concepts needed to understand the mathematical foundations of the physical chemistry sequence and have determined that these topics are scattered over Math 120, Math 220, Math 221, Math 203, Math 245, Math 303, Math 315, Math 323, Math 423, Math 402, and Math 445. It is no wonder that the students (and faculty) are frustrated.

In a survey of math requirements at other institutions, we are certainly not alone in only requiring a year of calculus. About half of the schools we surveyed require the same sequence of calculus for their chemistry degrees, Calc I and II. However,
half require more math, with about 1/5 of the schools requiring four semesters of higher math. Because of stringent requirements for American Chemical Society accreditation that require a certain distribution of courses and a minimum number of lab hours and because of the large general education requirements for students here at CofC, it is prohibitively difficult for us to require chemistry and biochemistry majors to take an additional semester of calculus. In addition, as our subject analysis indicates, taking Calculus III (in addition to Calc I and Calc II) would not adequately address some of the math deficiency. Thus, we propose to create a new 5-credit math course for chemistry and biochemistry majors that would replace the current Calc II degree requirement. The new course would blend the most essential elements of Calculus II and Calculus III with key concepts in linear algebra and differential equations in a single course that would meet daily for a semester. The majority of the topics (over 50%) actually stem from a traditional Calculus III course. The linearity of the chemistry curriculum makes it challenging to impose an additional semester of math study on these students. We feel that the students would prefer a single intense course with careful selection of topics that map onto the chemistry they will later learn. There are two alternatives to this approach. First, we could require chemistry and biochemistry majors to take Calculus III. This alternative adds 4 more credit hours and would bring the biochemistry degree from 72 credit hours to 76 credit hours. This option still leaves students unfamiliar with key concepts in linear algebra and differential equations and further delays their ability to start on the physical chemistry sequence. We could also design a new course that was meant to be taken with Calc II as a pre-requisite and require it for graduation, but again, this further adds more credit hours and introduces the burden of trying to fit in more courses into an already tight 4-year graduation plan. Again, we feel the 5-credit single class approach will best meet our curricular goals without introducing undue burden on the students’ graduation timing. We feel this approach also best maintains the ability of chemistry and biochemistry majors to participate in the Honors program and the ability to get minors or other majors.

The proposed new 5-credit class would be called “Vector Calculus with Chemical Applications”. It would be taught in the math department each semester with an expected enrollment of 20 students each semester.

Table 1: Student comments from graduating seniors requesting better math preparation

<table>
<thead>
<tr>
<th>Pre-req (for PChem) need to be adjusted to show how math dependent the course really is</th>
</tr>
</thead>
<tbody>
<tr>
<td>A stronger emphasis on math in physical chem would help the program</td>
</tr>
<tr>
<td>The subject matter (of physical chemistry) is extremely difficult to comprehend at times. I believe that at the least calculus 3 or a course in differential equations should be a co- or pre-requisite for these courses.</td>
</tr>
<tr>
<td>Physical chemistry seems like a lot more mathematics than chemistry</td>
</tr>
<tr>
<td>Physical chemistry is really difficult for most people, maybe a little more support for that course</td>
</tr>
<tr>
<td>Physical chemistry can be tough for those who do not have a strong math background, or have not taken a math course in some time</td>
</tr>
<tr>
<td>The only weakness that I encountered during my tenure at the College was the application of upper level mathematics. I would like to see a course offered that focuses on applications of calculus within physical chemistry. This would have made the physical chemistry courses far less daunting</td>
</tr>
<tr>
<td>One other course I would like to have had the option of taking is a mathematics for chemistry which would have better prepared me for p-Chem.</td>
</tr>
<tr>
<td>There aren’t enough math courses required to prepare for some of the math based chemistry courses</td>
</tr>
<tr>
<td>A stronger emphasis on the math in physical chem would help the program</td>
</tr>
<tr>
<td>The way physical chemistry is addressed and pre-req needs to be adjusted to show how math dependent the course actually is. Physical chemistry was extremely difficult because the concepts were not adequately introduced before we started. manipulation of the math. It almost seemed as if we were supposed to have taken another course in math before physical chemistry.</td>
</tr>
<tr>
<td>It is hard to go to an upper level pchem class when calculus was taken freshmen/sophomore year.</td>
</tr>
<tr>
<td>I did not like how I was pushed to take calculus so early when I was a freshman, but I didn’t take PChem until my senior year. By then it was difficult to remember.</td>
</tr>
<tr>
<td>I think bringing back the old math requirement of multivariate calculus, differential equations and linear algebra would actually make much of chemistry, particularly theory and P-Chem, easier and more enjoyable for the students. The College should consider an MIT-like two semester calculus course (covering Calc 1/2/3) for chemistry/biochemistry majors</td>
</tr>
</tbody>
</table>

This form was last updated on 06/03/13 and replaces all others.
D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

This course will not have an impact on any existing degree programs in Mathematics or Data Science. This course may decrease the enrollment in MATH 220 by at most 40 students per year.

This course will have an impact on the Chemistry and Biochemistry degree programs. The information below was provided by the Department of Chemistry, and a written acknowledgement is included at the end of this proposal.

The proposed course would deepen the students' understanding of core chemical concepts. The purposeful linking of math concepts to chemical applications will also make the course more appealing to these students and allow them to see immediate application of math principles. Graduating seniors in chemistry and biochemistry take an exit exam, the Majors Field Test. The test has four sections, Physical, Analytical, Inorganic, and Organic. Students who took additional math courses beyond Calc II typically score in the 90th percentile or above on the Physical Chemistry Section. We would expect to see improved scores on our MFT Physical Chemistry scores as the more focused and rigorous math class is implemented. We will have to plan the scheduling of this course such that the meeting time does not conflict with other key majors courses, as we currently do now for courses in biology. We would encourage students who know they will be applying for graduate school in chemistry to also take a traditional Calc II course. We have carefully chosen the name of the course to suggest that it is most similar to Calculus III. The name, plus the 5 credits, will indicate to graduate programs a course of more rigor, rather than less rigor. Other implications include that the students will likely not be able to replicate this course off campus. For transfer students who have already completed a year of calculus, we would allow them to take the course as a co-requisite with Physical Chemistry, rather than as a pre-requisite.

The new math class would replace the current degree requirement of Math 220 for the Chemistry and Biochemistry major. The proposed change increases the number of credit hours for a BS in Biochemistry from 72 credit hours to 73 credit hours. The proposed change increases the number of credit hours for the BS in Chemistry from 60 to 61. The proposed change increases the number of credit hours for the BA in Chemistry from 40 to 41.

This course is a collaborative effort between the Math Department and the Chemistry Department. It has been developed at the request of the Chemistry Department and numerous math faculty members have expressed an interest in teaching it.
E. EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: 
School: 
Subject Acronym: 
Course Number: 

Credit hours: ___ lecture ___ lab ___ seminar ___ independent study
Contact hours: ___ lecture ___ lab ___ seminar ___ independent study

Course title:

Course description (maximum 50 words, exactly as it appears in the catalog):

Restrictions (pre-requisites, co-requisites, majors only, etc.):

Cross-listing, if any:

Is this course repeatable? □ yes □ no If yes, how many total credit hours may the student earn? ___

F. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: Mathematics 
School: Science and Mathematics 
Subject Acronym: MATH 
Course Number: 229

Credit hours: ___5___ lecture ___ lab ___ seminar ___ independent study
Contact hours: ___5___ lecture ___ lab ___ seminar ___ independent study

Course title: Vector Calculus with Chemical Applications

Course description (maximum 50 words, exactly as it appears in the catalog): Multidimensional coordinate systems, vectors, matrices, matrix and vector operations, eigenvalues and eigenvectors, matrix groups and commutators, vector-valued functions, partial derivatives, directional derivatives, multiple integrals, line and surface integrals, vector calculus, Taylor series, Fourier series and transforms, a survey of ordinary and partial differential equations motivated by applications in chemistry.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Pre-requisites: Placement or C- or better in MATH 120/HONS 115

If this is a newly-created course, is it intended to be the equivalent of an existing course and replace it? □ yes □ no
If so, which course? ________________
Note: You must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department): None
Note: Cross-listed courses are equivalent.

Is this course repeatable? □ yes □ no If yes, how many total credit hours may the student earn? ___

This form was last updated on 06/03/13 and replaces all others.
SET 11-New course form Math 229

Is there an activity, lab, or other fee associated with this course? □ yes □ no What is the fee? $______

Note: The Senate cannot approve new fees, Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

G. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

No new costs will be associated with this course.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the course?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
<tr>
<td>1. Acquire a working knowledge of the major concepts of vector calculus relevant to chemistry.</td>
<td>This learning outcome will be assessed with signature questions on the course final exam. 70% of students should &quot;meet expectations&quot; or &quot;exceed expectations&quot; based on the rubric designed to assess the signature questions.</td>
</tr>
<tr>
<td>2. Demonstrate proficiency using mathematical models to solve applied problems in quantum chemistry, chemical kinetics, and thermodynamics.</td>
<td>This learning outcome will be assessed with signature questions on the course final exam. 70% of students should &quot;meet expectations&quot; or &quot;exceed expectations&quot; based on the rubric designed to assess the signature questions.</td>
</tr>
<tr>
<td>3. Be able to identify and apply the appropriate models to describe elementary physicochemical phenomena in mathematical terms.</td>
<td>This learning outcome will be assessed with signature questions on the course final exam. 70% of students should &quot;meet expectations&quot; or &quot;exceed expectations&quot; based on the rubric designed to assess the signature questions.</td>
</tr>
<tr>
<td>4. Demonstrate general knowledge of the fundamentals of vector calculus and the core mathematical theory apart from any particular application.</td>
<td>This learning outcome will be assessed with signature questions on the course final exam. 70% of students should &quot;meet expectations&quot; or &quot;exceed expectations&quot; based on the rubric designed to assess the signature questions.</td>
</tr>
</tbody>
</table>

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

Math 229 is being developed to facilitate delivery of the Chemistry and Biochemistry curriculum. Math 229 will support the development of critical thinking skills for Chemistry and Biochemistry majors by providing the advanced, foundational math skills required for deep understanding of chemical principles. Two SLO and departmental program goals will be facilitated by the addition of the new course: 1) Chemistry and Biochemistry majors will demonstrate proficiency in one or more of the more narrowly defined sub-disciplines of Chemistry, which include Analytical, Biochemistry, Inorganic, Organic, or Physical chemistry and 2) Chemistry and Biochemistry majors will demonstrate a positive appreciation for the educational experiences received within our department. By directly addressing graduate complaints about the math deficiencies through the joint development of this course, we expect our graduates to better appreciate their educational experience. By providing a solid math foundation prior to delivering complex, mathematical derivations of chemical principles in the Physical Chemistry sequence, our students are more likely to excel and master proficiency in the Physical Chemistry sub-discipline. The content of the course will introduce the needed math skills and students will be expected to demonstrate mastery of these skills at the end of the Math course. In addition, the reinforcement of the skills and demonstration of these skills will occur again over the two-semester sequence of Physical Chemistry.

This form was last updated on 06/03/13 and replaces all others.
SET 11-New course form Math 229

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☒ yes ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

A complete list of the program changes for the Chemistry and Biochemistry degree programs will be submitted under separate cover by the Department of Chemistry.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.
☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.
☒ (For new courses only) I have attached a syllabus.
☒ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.
☒ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.
☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
MATH 229: Vector Calculus with Chemical Applications
College of Charleston Department of Mathematics
Course Syllabus

Instructor: Instruct Name, Email: email@cofsc.edu, Phone: (843) 953-xxxx
Office: Robert Scott Small Building 3xx, Office Hours: TBD, and by appointment.

- **Disclaimer:** The information presented in this course syllabus is subject to change (with notification) at the discretion of the Instructor.

- **Lecture Meetings:** 9:00 am - 9:50 am MWF; 9:25 am - 10:40 am TR, all in Maybank Hall 2XX.

- **Course Website:** Course materials, assignments, and announcements will be available at the course OAKS website. Students are responsible for checking the site regularly for any information relevant to the class.


- **Prerequisites:** Placement or C- or better in MATH 120/HONS 115.

- **Course Description:** (5 Credit Hours) Multidimensional coordinate systems, vectors, matrices, matrix and vector operations, eigenvalues and eigenvectors, matrix groups and commutators, vector-valued functions, partial derivatives, directional derivatives, multiple integrals, line and surface integrals, vector calculus, Taylor series, Fourier series and transforms, a survey of ordinary and partial differential equations motivated by applications in chemistry.

- **Student Learning Outcomes:** Students are expected to display a thorough understanding of the topics covered.

1. Acquire a working knowledge of the major concepts of vector calculus relevant to chemistry.
2. Demonstrate proficiency using mathematical models to solve applied problems in quantum chemistry, chemical kinetics, and thermodynamics.
3. Be able to identify and apply the appropriate models to describe elementary physiochemical phenomena in mathematical terms.
4. Demonstrate general knowledge of the fundamentals of vector calculus and the core mathematical theory apart from any particular application.

These outcomes will be assessed on the final exam. The student will accomplish the above outcomes through attending lectures, taking quizzes and exams, completing several homework assignments, and completing a final exam. **Students should expect to spend at least 10 (TEN) hours per week on reading, homework, and studying, in addition to the five class meetings per week.**

- **Attendance:** Attendance to all lectures is expected, and students are responsible for materials covered in classes that are missed. The instructor will make every attempt to be helpful to students who miss class meetings due to illness or other unavoidable circumstances. Students who are absent excessively from class (more than 8 absences) will be dropped at the WA (Withdrawal for Excessive Absences) date, which is October XX.

- **Homework:** Homework assignments will be given to students on a regular basis (about once a week). Individual assignments may have different point totals, and the homework assignment average will be computed by taking the total number of points earned and dividing by the total number of possible points.

  - All homework should be written or typeset (if the student’s handwriting is poor or if the student prefers to type) clearly and concisely, on the front sides (only) of stapled pages. Information on the \LaTeX\ typesetting system will be made available on the OAKS course.

  - All problem statements should be reproduced when feasible, and solutions should be explicitly delimited from the problem statements and/or other comments.
- Homework assignments will be made available on OAKS, and the due date and time for assignments will be given with each particular assignment. All homework is due when stated and will not be accepted late. Exceptions may be made at the discretion of the instructor in exceptional circumstances.

- Since the purpose of homework is to help you learn, you may discuss homework problems with others (if you do so, acknowledge that on your homework). However, you must work out and write up your own solutions—you may not look at the homework of someone else (or at a common source) or show anyone your homework. Copying is cheating (see below).

- Copying and cheating is strictly prohibited. Offenses will be pursued in accordance with the College’s policy on cheating (see Academic Integrity).

* Quizzes: Periodically, short quizzes will be given in class. The content of the quizzes will be based on lectures, reading assignments, and homework problems. At the end of the semester, around 10% of your lowest quizzes will be dropped and your quiz average will be computed using the remaining quiz grades.

* Exams: There will be four (midterm) exams administered throughout the semester. The dates for the four exams are:
  - September 11th (Thursday)
  - October 2nd (Thursday)
  - October 28th (Thursday)
  - November 20th (Thursday)

Missed Midterm Exams: No missed midterm exams will be made up. If a student misses an exam without a valid excuse, the grade will be zero. If a student misses an exam with a valid excuse, then the average of the other two exams will be used for the missed exam grade. A valid excuse means that the student has a valid Absence Memo from the Office of Student Affairs or some other documentation from a valid campus office stating that the student is traveling for an extracurricular activity (with documentation), etc. In these cases the student should notify the instructor ASAP (before the exam if at all possible) that they will be missing the exam.

* Final Exam: The final exam is cumulative and is scheduled for 8:00am-11:00am on Monday, December 8th. It is very important to note that you will not be allowed to take the final exam early and you should not make plans to leave campus for good prior to that date and time.

* Grading Policy:

<table>
<thead>
<tr>
<th>Midterm Grade</th>
<th>Final Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes 15%</td>
<td>15%</td>
</tr>
<tr>
<td>Homework 10%</td>
<td>10%</td>
</tr>
<tr>
<td>First Two Exams 75%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
</tr>
<tr>
<td>A-</td>
<td>90-92</td>
</tr>
<tr>
<td>B+</td>
<td>87-89</td>
</tr>
<tr>
<td>B</td>
<td>83-86</td>
</tr>
<tr>
<td>B-</td>
<td>80-82</td>
</tr>
<tr>
<td>C+</td>
<td>77-79</td>
</tr>
<tr>
<td>C</td>
<td>73-76</td>
</tr>
<tr>
<td>C-</td>
<td>70-72</td>
</tr>
<tr>
<td>D+</td>
<td>67-69</td>
</tr>
<tr>
<td>D</td>
<td>63-66</td>
</tr>
<tr>
<td>D-</td>
<td>60-62</td>
</tr>
<tr>
<td>F</td>
<td>0-59</td>
</tr>
</tbody>
</table>

* Extra Credit: There will be no opportunities for extra credit in this course. Your grade will be calculated using the structure given above.

* Accommodations: The College will make reasonable accommodations for persons with documented disabilities. Students should apply at the Center for Disability Services/SNAP, located on the first floor of the Lightsy Center, Suite 104. Students approved for accommodations are responsible for notifying the Instructor as soon as possible and for contacting the Instructor at least one week before any accommodation is needed.
- **Academic Integrity:** All College of Charleston academic integrity policies, including the Honor Code and the Code of Conduct, apply to this course. Violations of the honor code will be dealt with immediately and referred to the Office of the Dean of Students. Penalties for violating the honor code may include receiving a grade of XF and/or suspension/expulsion from the College. Refer to [http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php](http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php) and [http://deanofstudents.cofc.edu/policies-and-procedures/honor-system.php](http://deanofstudents.cofc.edu/policies-and-procedures/honor-system.php) and feel free to ask the instructor for help if you have any questions.

- **Classroom Disruption:** Students are expected to behave in a manner consistent with a positive collegiate learning environment. Any student who disrupts the class to the point where the ability of the instructor to teach or the ability of the students to learn is impaired will be asked to leave and will be referred to the Office of the Dean of Students for further action. Please see [http://deanofstudents.cofc.edu/policies-and-procedures/classroom-disruption.php](http://deanofstudents.cofc.edu/policies-and-procedures/classroom-disruption.php) for the College's policy on classroom disruption.

### Schedule of Topics

- **Week 1:** Diagnostic quiz, Cartesian, polar, cylindrical, and spherical coordinate systems, review of complex numbers, vectors and vector operations, orthogonality, equations of lines and planes, systems of linear equations, matrices.
- **Week 2:** Row reduction and echelon forms, solution sets, linear independence and dimension, matrix operations, partitioned matrices, inverses.
- **Week 3:** Determinants, rank, vector spaces and subspaces, basis, null and column space, eigenvalues and eigenvectors.
- **Week 4:** Linear operators (transformations), symmetry operators, operator algebras and the commutator, matrix groups.
- **Week 5:** Review of limits and derivatives, vector-valued functions and parametric curves, derivatives of vector functions, arc length and curvature, functions of several variables, vector fields.
- **Week 6:** Partial derivatives, the chain rule and the total differential, implicit differentiation and Euler's cyclical rule, directional derivatives and the gradient, maximum and minimum values.
- **Week 7:** Derivatives in cylindrical and spherical coordinates, curl and divergence, review of integration including substitution, integration by parts, improper integrals, multiple integrals over rectangles.
- **Week 8:** Change of variables in multiple integrals, multiple integrals over general regions, integrals in polar, cylindrical, and spherical coordinates, line integrals.
- **Week 9:** Green's Theorem, parametric surfaces and surface integrals, Stokes' Theorem, the Divergence Theorem.
- **Week 10:** Tangent lines and planes, linear approximation, power series, Taylor and Maclaurin series.
- **Week 11:** Fourier series, operations on series, Fourier transform, Laplace transform.
- **Week 12:** Ordinary differential equations, separable equations, exact equations, integrating factors.
- **Week 13:** Harmonic oscillators, Legendre polynomials, Hermite polynomials.
- **Week 14:** Partial differential equations, heat equation, wave equation, partial differential equations in cylindrical and spherical coordinates.
SET 12-Course Change Form Chem 341

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco  Phone: 3-7455  Email: gelascop@cofc.edu

Department or Program: Chemistry and Biochemistry  School: SSM

Subject Acronym and Course Number: CHEM 341

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☒ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☐ Course Number (you must submit a course deactivation request for the old course number)
☒ Course Name
☒ Course Description
☐ Credit/Contact Hours
☒ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

We are removing the Chem 341 pre-requisite from Chem 342. Chem 342 (Physical Chemistry II) does not build directly on the material from 341. The pre-reqs for both courses need to be adjusted to reflect the need for the new math course, but not a dependence on the other course.

We are updating the course description to better reflect what is currently covered in the course currently.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

These changes only affect chemistry and biochemistry majors. The change will allow more flexibility in student scheduling. This change does not affect the number of credit hours required. We are changing the name to be more descriptive so that a student isn't confused that they can now take PChem II before PChem I.
SET 12-Course Change Form Chem 341

EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: Chemistry and Biochemistry   School: SSM   Subject Acronym: Chem   Course Number: 341

Credit hours: 3 lecture __ lab __ seminar __ independent study
Contact hours: 3 lecture __ lab __ seminar __ independent study

Course title: Physical Chemistry I

Course description (maximum 50 words, exactly as it appears in the catalog):

Basic principles of chemistry treated primarily from a theoretical viewpoint. The major topics covered are atomic and molecular structure; elementary thermodynamics and statistical mechanics; properties of gases, liquids, and solids; theories of solution; homogeneous and heterogeneous equilibria; electrochemistry and surface chemistry; spectroscopy; transport processes; and chemical kinetics. Lectures 3 hours a week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Pre-requisite: Chem 221 and Math 220; Math 221 is strongly recommended
Co-requisite: Chem 341L

Cross-listing, if any:

Is this course repeatable? ☐ yes ☒ no  If yes, how many total credit hours may the student earn? ___

E. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use **boldface** for the information that is changing.

Department: Chemistry and Biochemistry   School: SSM   Subject Acronym: CHEM   Course Number: 341

Credit hours: 3 lecture __ lab __ seminar __ independent study
Contact hours: 3 lecture __ lab __ seminar __ independent study

Course title: Thermodynamics, Statistical Thermodynamics, and Chemical Kinetics

Course description (maximum 50 words, exactly as it appears in the catalog):

A treatment of the laws of classical thermodynamics, followed by applications to the properties of gases, liquids, and solids, as well as to reactions, phase, and chemical equilibrium. Chemical reactions thermodynamics and the Phase Diagrams of gases and liquids, as well as an introduction to statistical thermodynamics and chemical kinetics.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Pre-requisite: Chem 221, Math 220; Chem 221 is strongly recommended
Co-requisite: Chem 341L

If this is a newly-created course, is it intended to be the equivalent of an existing course? ☐ yes ☐ no
If so, which course? ____________

This form was last updated on 11/19/13 and replaces all others.
SET 12-Course Change Form Chem 341

If equivalent, will the newly-created course replace the existing course? ☐ yes ☐ no
Note: If yes, you must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department): _______________
Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? __

Is there an activity, lab, or other fee associated with this course? ☐ yes ☒ no What is the fee? $____
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

F. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

No new costs or cost savings.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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</table>
SET 12-Course Change Form Chem 341

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☐ yes ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.

This form was last updated on 11/19/13 and replaces all others.
SET 12-Course Change Form Chem 341L

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco       Phone: 3-7455       Email: gelascop@cofc.edu

Department or Program: Chemistry and Biochemistry    School: SSM

Subject Acronym and Course Number: CHEM 341L

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☒ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)

☐ Course Number (you must submit a course deactivation request for the old course number)

☐ Course Name
☐ Course Description
☐ Credit/Contact Hours
☒ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)

☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☒ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

We are removing the Chem 341 and 341L pre-requisite from Chem 342. Chem 342 (Physical Chemistry II) does not build directly on the material from 341. New pre-requisites will be Chem 220/220L (new numbering) and Math 229 for lecture courses. Corequisite of lectures will be the corresponding lab course. Corequisite of lab courses will be corresponding lecture courses.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

These changes only affect chemistry and biochemistry majors. The change will allow more flexibility in student scheduling. This change does not affect the number of credit hours required.
SET 12-Course Change Form Chem 341L

EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: Chemistry and Biochemistry  School: SSM  Subject Acronym: Chem  Course Number: 341L

Credit hours: 1 lab  Contact hours: 3 lab

Course title: Physical Chemistry I

Course description (maximum 50 words, exactly as it appears in the catalog):

A laboratory program to accompany CHEM 341. Laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Pre-requisite: Chem 221 and Math 220; Math 221 is strongly recommended
Co-requisite: Chem 341

Cross-listing, if any:

Is this course repeatable? □ yes  □ no  If yes, how many total credit hours may the student earn? _____

E. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: Chemistry and Biochemistry  School: SSM  Subject Acronym: CHEM  Course Number: 341L

Credit hours: 1 lab  Contact hours: 3 lab

Course title: Thermodynamics, Thermodynamics and Chemistry Laboratory

Course description (maximum 50 words, exactly as it appears in the catalog):

A laboratory program to accompany CHEM 341. Laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Co-requisite: Chem 341

If this is a newly-created course, is it intended to be the equivalent of an existing course? □ yes  □ no
If so, which course? __________________________

If equivalent, will the newly-created course replace the existing course? □ yes  □ no
Note: If yes, you must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department): __________________________
Note: Cross-listed courses are equivalent.

This form was last updated on 11/19/13 and replaces all others.
SET 12-Course Change Form Chem 3411

Is this course repeatable? □ yes ☒ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? ☒ yes □ no What is the fee? $ 125

Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

F. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

No new costs or cost savings.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

This form was last updated on 11/19/13 and replaces all others.
SET 12-Course Change Form Chem 341L

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? ☐ yes  ☐ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 12-Course Change Form Chem 342

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
• Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
• Fill out the parts of the form specified in part B. You must do this before your request can move forward!
• Remember that your changes will not be implemented until the next catalog year at the earliest.
• If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.
Name: Pamela Riggs-Gelasco  Phone: 3-7455  Email: gelascop@cofc.edu
Department or Program: Chemistry and Biochemistry  School: SSM
Subject Acronym and Course Number: CHEM 342
Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☒ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
☐ Course Number (you must submit a course deactivation request for the old course number)
☒ Course Name
☒ Course Description
☐ Credit/Contact Hours
☒ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

We are removing the Chem 341 pre-requisite from Chem 342. Chem 342 (Physical Chemistry II) does not build directly on the material from 341. The pre-req for Chem 342 needs to be changed to reflect the requirement for the new Math course and the number change for analytical chemistry.

We are also updating the course description to reflect the current course coverage.

We are changing the names of Chem 341 and 342 so that they are not "PChem I" and "PChem II", since they will not necessarily be taken in that order. Please note that the class content is the same, despite these changes.

This form was last updated on 11/19/13 and replaces all others.
D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

These changes only affect chemistry and biochemistry majors. The change will allow more flexibility in student scheduling. This change does not affect the number of credit hours required. We are changing the name to be more descriptive so that a student isn’t confused that they can now take PChem II before PChem I.

EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: Chemistry and Biochemistry  School: SSM  Subject Acronym: Chem  Course Number: 342

Credit hours:  3 lecture __ lab __ seminar __ independent study
Contact hours:  3 lecture __ lab __ seminar __ independent study

Course title: Physical Chemistry II

Course description (maximum 50 words, exactly as it appears in the catalog):

Basic principles of chemistry treated primarily from a theoretical viewpoint. The major topics covered are atomic and molecular structure; elementary thermodynamics and statistical mechanics; properties of gases, liquids, and solids; theories of solution; homogeneous and heterogeneous equilibria; electrochemistry and surface chemistry; spectroscopy; transport processes; and chemical kinetics. Lectures 3 hours a week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Pre-requisite: Chem 341 and 341L
Co-requisite: Chem 342L

Cross-listing, if any:

Is this course repeatable?  □ yes  □ no  If yes, how many total credit hours may the student earn? ____

E. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: Chemistry and Biochemistry  School: SSM  Subject Acronym: CHEM  Course Number: 342

Credit hours:  3 lecture __ lab __ seminar __ independent study
Contact hours:  3 lecture __ lab __ seminar __ independent study

Course title: ____________________________________________________________________

Course description (maximum 50 words, exactly as it appears in the catalog):

This form was last updated on 11/19/13 and replaces all others.
SET 12-Course Change Form Chem 342

Objectives: Application of quantum mechanics to chemical bonding and spectroscopy. The examination of the fundamental factors that determine molecular structure, including the use of quantum mechanical principles to predict molecular geometry, orbital overlap, and reactive properties.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Pre-requisite: Chem 342L
Co-requisite: Chem 342L

If this is a newly-created course, is it intended to be the equivalent of an existing course? ☐ yes ☐ no If so, which course? ________________

If equivalent, will the newly-created course replace the existing course? ☐ yes ☐ no
Note: If yes, you must deactivate the course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department): ________________
Note: Cross-listed courses are equivalent.

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? ☐ yes ☒ no What is the fee? $_____
Note: The Senate cannot approve new fees. Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

F. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

No new costs or cost savings.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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This form was last updated on 11/19/13 and replaces all others.
How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? □ yes □ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

This course is already part of the degree program, so no changes necessary.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.

This form was last updated on 11/19/13 and replaces all others.
SET 12-Course Change Form Chem 342L

FACULTY CURRICULUM COMMITTEE
COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.
   Name: Pamela Riggs-Gelasco       Phone: 3-7455       Email: gelascop@cofc.edu
   Department or Program: Chemistry and Biochemistry    School: SSM
   Subject Acronym and Course Number: CHEM 342L
   Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☒ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
   ☐ Course Number (you must submit a course deactivation request for the old course number)
   ☒ Course Name
   ☐ Course Description
   ☐ Credit/Contact Hours
   ☒ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

We are removing the Chem 341 and 341L pre-requisite from Chem 342. Chem 342 (Physical Chemistry II) does not build directly on the material from 341. New pre-requisites will be Chem 220/220L (new numbering) and Math 229 for lecture courses. Corequisite of lectures will be the corresponding lab course. Corequisite of lab courses will be corresponding lecture courses.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

These changes only affect chemistry and biochemistry majors. The change will allow more flexibility in student scheduling. This change does not affect the number of credit hours required.

This form was last updated on 11/19/13 and replaces all others.
SET 12-Course Change Form Chem 342L
We are changing the name to be more descriptive so that a student isn’t confused that they can now take PChem II before PChem.

EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: Chemistry and Biochemistry School: SSM Subject Acronym: Chem Course Number: 342L
Credit hours: 1 lab _ _ seminar _ _ independent study
Contact hours: 3 lab _ _ seminar _ _ independent study

Course title: Physical Chemistry II Laboratory

Course description (maximum 50 words, exactly as it appears in the catalog):

A laboratory program to accompany Chem 342. Laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Pre-requisite: Chem 341 and 341L
Co-requisite: Chem 342

Cross-listing, if any:

Is this course repeatable? [ ] yes [ ] no If yes, how many total credit hours may the student earn? ___

E. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: Chemistry and Biochemistry School: SSM Subject Acronym: CHEM Course Number: 342L
Credit hours: 1 lab
Contact hours: 3 lab

Course title:

Course description (maximum 50 words, exactly as it appears in the catalog):

A laboratory program to accompany Chem 342. Laboratory three hours per week.

Restrictions (pre-requisites, co-requisites, majors only, etc.):
Co-requisite: Chem 342

If this is a newly-created course, is it intended to be the equivalent of an existing course? [ ] yes [ ] no
If so, which course? __________________

If equivalent, will the newly-created course replace the existing course? [ ] yes [ ] no
Note: If yes, you must deactivate that course by submitting an additional Course Form.

Cross-listing, if any (submit approval from relevant department): ________________

This form was last updated on 11/19/13 and replaces all others.
SET 12-Course Change Form Chem 342L

Note: Cross-listed courses are equivalent.

Is this course repeatable? □ yes ☑ no If yes, how many total credit hours may the student earn? ___

Is there an activity, lab, or other fee associated with this course? ☑ yes ☐ no What is the fee? $__125___

Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

Select the category that applies:

F. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

No new costs or cost savings.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?
SFT 12-Course Change Form Chem 3421

I. PROGRAM CHANGES. Will this course be added to the existing degree requirements or list of approved electives of a major, minor, or concentration? □ yes □ no

If yes, please attach a Change Minor and/or Change Major/Program Form as appropriate.

J. CHECKLIST.

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ (For new courses only) I have attached a syllabus.

☐ (For courses used in any way by other departments, including cross-listing) I have attached an acknowledgement from the relevant department.

☐ (For courses intended to fulfill a Gen Ed requirement) I have submitted the proposal to the Gen Ed committee.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 13-Course Change Form Chem 354

FACULTY CURRICULUM COMMITTEE COURSE FORM

Instructions:
- Please fill out one of these forms for each course you are adding, changing, deactivating, or reactivating.
- Fill out the parts of the form specified in part B. **You must do this before your request can move forward!**
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, start by checking the instructions on the website. Please feel free to contact the committee chairs with any remaining questions you might have.

A. CONTACT/COURSE INFORMATION.

Name: Pamela Riggs-Gelasco  Phone: 3-7455  Email: gelascop@cofc.edu

Department or Program: Chemistry and Biochemistry  School: SSM

Subject Acronym and Course Number: CHEM 354

Catalog Year in which changes will take effect: FALL 2014

B. TYPE OF REQUEST. Please check all that apply, then fill out the specified parts of the form.

☐ Add a New Course (complete parts C, D, F, G, H, I, J, K)
☒ Change Part of an Existing Course (complete parts C, D, E, F, G, I, J, K)
  ☐ Course Number (you must submit a course deactivation request for the old course number)
  ☐ Course Name
  ☐ Course Description
  ☐ Credit/Contact Hours
  ☒ Restrictions (prerequisites, co-requisites, junior/senior standing, etc.)
  ☐ Deactivate an Existing Course (complete parts C, D, E, G, I, J, K)
  ☐ Reactivate a Previously-Deactivated Course (complete parts C, D, E, G, I, J, K)

C. RATIONALE AND EXPLANATION. Please describe your request and explain why you are making it.

We are removing the pre-requisite of Chem 351 for Chem 354. Chem 351 will now be listed as a co-requisite or pre-requisite. This allows students to take the required lab course earlier and sets us up to institute a new 2nd semester lab course in the future. This will give students more flexibility in planning their course schedules. Note: Chem 354 requires Chem 351 as a co-req or a pre-req, but Chem 351 does not require Chem 354 as a co-req. This allows students who are interested in the lecture only to take that course for med school preparation.

D. IMPACT ON EXISTING PROGRAMS AND COURSES. Please briefly describe the impact of your request on your own programs and courses as well other programs and courses. If another program requires the course, you must submit their written acknowledgement with this proposal. Also, the affected program must describe any change in the number of credit hours they require. Include a list of similar courses in other departments and explain any overlap.

This change affects biochemistry and biology majors in the molecular emphasis track. The change will allow more flexibility in student scheduling. This change does not affect the number of credit hours required.

This form was last updated on 11/19/13 and replaces all others.
SET 13-Course Change Form Chem 354

EXISTING COURSE INFORMATION. If you are proposing a new course, just leave this blank. Otherwise, please fill out all fields.

Department: Chemistry and Biochemistry   School: SSM   Subject Acronym: Chem   Course Number: 354
Credit hours: 1 lab
Contact hours: 3 lab
Course title: Biochemistry Lab
Course description (maximum 50 words, exactly as it appears in the catalog):
A laboratory program designed to introduce the student to the study of biological molecules. Experiments will include procedures for the quantification, isolation, and characterization of various cellular components.
Restrictions (pre-requisites, co-requisites, majors only, etc.):
Pre-requisite: CHEM 351
Cross-listing, if any:
Is this course repeatable? ☐ yes  ☑ no  If yes, how many total credit hours may the student earn? ___

E. NEW COURSE INFORMATION. If you are deactivating a course, leave this blank. Otherwise, please fill out all fields. For changed courses, use boldface for the information that is changing.

Department: Chemistry and Biochemistry   School: SSM   Subject Acronym: CHEM   Course Number: 354
Credit hours: 1 lab
Contact hours: 3 lab
Course title: Biochemistry Lab
Course description (maximum 50 words, exactly as it appears in the catalog):
A laboratory program designed to introduce the student to the study of biological molecules. Experiments will include procedures for the quantification, isolation, and characterization of various cellular components.

Restrictions (pre-requisites, co-requisites, majors only, etc.):

If this is a newly-created course, is it intended to be the equivalent of an existing course? ☐ yes  ☐ no
If so, which course? ________________
If equivalent, will the newly-created course replace the existing course? ☐ yes  ☐ no
Note: If yes, you must deactivate that course by submitting an additional Course Form.
Cross-listing, if any (submit approval from relevant department): ________________
Note: Cross-listed courses are equivalent.

This form was last updated on 11/19/13 and replaces all others.
SET 13-Course Change Form Chem 354

Is this course repeatable? ☐ yes ☒ no If yes, how many total credit hours may the student earn? _____

Is there an activity, lab, or other fee associated with this course? ☒ yes ☐ no What is the fee? $125
Note: The Senate cannot approve new fees; Business Affairs will submit any such request to the Board of Trustees. The course can still be created, but the fee will not be attached until the Board has approved it.

F. COSTS. List all of the new costs or cost savings (including new faculty/staff requests, library, equipment, etc.) associated with your request.

No new costs or cost savings.

H. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
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<tr>
<td>What will students know and be able to do when they complete the course?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
</tbody>
</table>

1.

2.

3.

4.

How does this course align with the student learning outcomes articulated for the major, program, or general education? What program-level outcome or outcomes does it support? Is the content or skill introduced, reinforced, or demonstrated in this course?
SET 14: Change Program Form BS Biochemistry

FACULTY CURRICULUM COMMITTEE
CHANGE/DELETE PROGRAM FORM

Instructions:
- Please fill out all of the portions of the form that are specified in section B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, please start by checking the detailed instructions on the website.
- Please feel free to contact the committee chair with any remaining questions you might have.

A. CONTACT INFORMATION.

Name: Pam Riggs-Gelasco  Phone: 3-7455  Email: gelascop@cofc.edu

School: SSM  Department or Program: Chemistry and Biochemistry

Name and Acronym of Major: Biochemistry BS; I am not aware if the Major has an acronym; our courses, whether they are for biochemistry or chemistry, all have the acronym “CHEM”. Maybe the acronym for the major is BIOC.

B. CATEGORY OF REVIEW. Please check all that apply, then fill out the specified parts of the form.

☑ Change Request (fill out all sections)
   ☑ Add an existing course to requirements or electives
   ☑ Add a new course to requirements or electives (attach completed course form for each)
   ☒ Delete courses from requirements or electives
   ☐ Add or modify concentration*
   ☐ Add or modify cognate*

*Note: Only concentrations and cognates requiring 18 or more credit hours will be tracked in Banner and Degree Works and noted on the transcript.

☐ Terminate Program (fill out E, G, H, and I)
   ☐ Terminate degree
   ☐ Terminate major
   ☐ Terminate concentration
   ☐ Terminate cognate

C. GENERAL INFORMATION

Number of Current Credit Hours (for existing program): 72
Number of Proposed Credit Hours (for changed program): 74-78
Catalog Year in which changes will take effect: FALL 2014

D. CURRICULUM. Please list every change you are making below AND attach the current Program of Study Worksheet for this major (http://registrar.cofc.edu/program-of-study-worksheets/index.php) with changes marked in RED. Additions should show where the course will be inserted, deletions should be noted by crossing out the course, and moves indicated with arrows. Distinguish between required and elective courses, and note any prerequisites, corequisites, sequencing, or other restrictions. Provide the catalog description and course list exactly as they should appear in the catalog. For each new course, submit the Curriculum Committee’s Course Form and a sample syllabus.

This form was last updated on 6/6/2013 and replaces all others.  Page 1 of 5
SET 14: Change Program Form BS Biochemistry

1) The 4-credit course 221/221L will be deactivated and replaced with a newly numbered 5 credit course set, Chem 220/Chem 220L.
2) The 4 credit course Math 220 will be removed and replaced with a new 5-credit course, Math 229.
3) The 4th 300-level elective course in Biology department will be removed.
4) Add a Chemistry-based Lab menu. The lab menu should read “Select 2 of the following courses that add to a minimum of 3 lab credit hours: Chem 355, Chem 371, Chem 481, Chem 482, Chem 312L, Chem 421L, Chem 422L. (Note: Chem 371 is 2 credits lab and 1 credit of lecture)
5) Add a Chemistry-based Lecture menu. The lecture menu should read “Select one of the following courses: Chem 353, Chem 356, Chem 421, Chem 422, Chem 431.”
6) Chem 511 will be deactivated and an identical course now numbered Chem 311 will be added instead.

Please note the menu choices in item 4, 5, and 6 reflect new course numbers but represent existing courses.

E. RATIONALE AND EXPLANATION. Please provide a narrative addressing the request you are making and why you are making it.

The chemistry and biochemistry BS degrees are both certified by the American Chemical Society. ACS did not find the chemistry content in the Biology elective courses as acceptable towards counting for a Biochemistry ACS certification; offering new biochemistry courses in lieu of biology courses is also a change requested by students for years of senior surveys. ACS has also announced that they will likely require a capstone course in the 2014 curriculum changes for accreditation. The lecture menu includes classes that are already capstones (or can easily be adapted to be a capstone) meaning that they are primarily literature based and tend to be interdisciplinary or build heavily on multiple courses. A certified degree must include 400 hours of lab contact hours and new changes in certification no longer allow us to count General Chemistry lab hours or these biology course lab hours or the physics courses lab hours. Thus, we constructed a menu that will add at least 108 lab hours to bring up the current number of lab hours from 324 to 396-432 (depending on the courses chosen). In selecting the courses, we included research courses (Chem 481 and 482). Many students, including Honors students, opt to take these courses anyway as electives (in 2013, 75% of Biochem majors took these courses) and now they will essentially replace the former 1-credit lab from Biology. Despite the increase in credit hours, many majors will find the new major requirements easier to fulfill because of this new option that meets ACS guidelines. In addition, students have been requesting new biochemistry lecture courses in our assessment surveys and these were added last year (Chem 353 and 356). Now students will be able to take these courses with the removal of the 4th biology lecture elective.

The proposed new math course, Math 229, is a survey of math topics needed to understand physical chemistry. Topics in the course derive primarily from Math 221, but include topics from many other math courses such as differential equations and linear algebra. Students have been requesting better math preparation for the year-long sequence of Physical Chemistry for years. A recent survey of the math needed to excel in Physical Chemistry spans 11 different math courses. Thus, we collaborated with the math department to design a new course with carefully selected topics that include the essential elements of vector calculus in addition to other critical math skills. This is an assessment driven change, and a student requested change. We chose to expand a normal 4-credit course to a 5-credit course to allow time sufficient class time to cover a wider array of topics. This substitution is preferable over adding an additional math course to the major, which would greatly impact a student’s ability to finish the curriculum in 4 years.

The change in the credit hours for Chem 220/220L (formerly Chem 221/221L) reflects current practice for contact hours (3 lecture contact hours and 6 lab contact hours). Although it adds a credit hour to the major, it does not
SET 14: Change Program Form BS Biochemistry

reflect an increase in current workload for the student. The change was requested to remedy the accounting of credit hours and teaching effort.

We renumbered Chem 511 to Chem 311 to better reflect that it is a junior-senior level course.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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| 1. The BS Biochemistry major will demonstrate proficiency in the broader discipline of Chemistry. | How: Educational Testing Service Major Field Test in Chemistry which is administered each spring as part of the required Senior Seminar capstone in the major, CHEM 492. CHEM 492 must be taken the spring semester immediately preceding graduation.  
Who: All majors  
When: Within final year of time at CofC  
How well: We expect that, on average, our students will score at or above the 50% percentile on this instrument in terms of their overall score. |
| 2. The BS Biochemistry major will demonstrate proficiency in one or more of the more narrowly defined sub-disciplines of Chemistry, which include Analytical, Biochemistry, Inorganic, Organic, or Physical chemistry. | How: Educational Testing Service Major Field Test in Chemistry which is administered each spring as part of the required Senior Seminar capstone in the major, CHEM 492.  
When: CHEM 492 must be taken the spring semester immediately preceding graduation.  
How Well: We expect that, on average, our students will score at or above the 60% percentile on this instrument in terms of their score on at least one of the sub-disciplinary test areas. While the test does not have a biochemistry section, it does filter out and provide a score for the smaller number of biochemistry related questions.  
Who: all majors |
### SET 14: Change Program Form BS Biochemistry

| 3. The BS Biochemistry major will demonstrate a positive appreciation for the educational experiences received within our department. | How: Senior survey administered as part of the CHEM 492 course, response to these questions: "Your experience in the department has served you well in preparation for your anticipated career goals" & "My overall opinion of the Department of Chemistry and Biochemistry is that it is an excellent department" and senior survey administered by the College of Charleston should reflect high satisfaction with the major  
Who: All majors  
When: Senior year  
How well: >70% in College’s exit senior survey in the area of overall academic experience and program of study.  
>70% rate strongly agree to questions in our own survey. |
|---|---|
| 4. BS Biochem majors achieve success in attaining career goals | How: The department will track student career intentions prior to leaving campus by using iBiosketch, required exit surveys, Facebook, and LinkedIn.  
Who: All majors  
When: Just prior to graduation and after graduation updates periodically  
How well: Our hope is that 75% of students desiring to stay in science will successfully be matriculated in a graduate program or will be successfully employed. |
| 5. The majority of BS Biochemistry majors participate in research opportunities as a capstone experience. | How: We will track research participation by requiring mandatory safety training in all research courses and for summer research participation. We will catch outside research experiences via our required senior survey. We will assess if research participation ends in successful career outcomes based on student goals using iBiosketch, surveys, and communication with faculty working with students.  
Who: All majors  
When: Tracking will occur primarily in senior year, but annual records are kept  
How well: We would like 75% or more of our majors to get a research experience |

**Additional Outcomes or Comments:**

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This form was last updated on 6/6/2013 and replaces all others.
G. IMPACT ON EXISTING PROGRAMS AND COURSES. Please describe the impact of this request on other programs and courses. If you are deleting a program, please describe the effect on all programs that will be impacted; if you are adding or changing a program, please explain any overlap with existing programs at the College.

The program changes make it easier for Biology majors to take their own upper-level courses, as biochemistry majors will not be occupying as many spots in those courses.

The change in credit-hour for Chem 220/220L affects Marine Biology majors who opt to take that class.

The change in math course requires that math regularly offer this course, something that they are prepared and willing to do.

H. COSTS ASSOCIATED WITH THE REQUESTED ACTION. List all of the new costs or cost savings (including new faculty/staff requests, library, or equipment) associated with your request.

The only change that could potentially cost more is that Math will now be offering an additional course. In reality, it will probably only shift enrollments from Math 220 to Math 229.

1. CHECKLIST

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☒ I have attached a Course Form for each newly-created or modified course.

☒ (For proposals that affect other departments in any way) I have attached an acknowledgement from the relevant department.

☒ I have provided the complete curriculum for the program, concentration, emphasis, etc., including the description and course list, exactly as it should appear in the catalog.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.

This form was last updated on 6/6/2013 and replaces all others.
SET 15: Change Program Form BS Chemistry

FACULTY CURRICULUM COMMITTEE
CHANGE/DELETE PROGRAM FORM

Instructions:
- Please fill out all of the portions of the form that are specified in section B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, please start by checking the detailed instructions on the website.
- Please feel free to contact the committee chair with any remaining questions you might have.

A. CONTACT INFORMATION.

Name: Pam Riggs-Gelasco Phone: 3-7455 Email: gelascop@cofc.edu
School: SSM Department or Program: Chemistry and Biochemistry
Name and Acronym of Major: Chemistry BS; CHEM

B. CATEGORY OF REVIEW. Please check all that apply, then fill out the specified parts of the form.

☐ Change Request (fill out all sections)
  ☑ Add an existing course to requirements or electives
  ☑ Add a new course to requirements or electives (attach completed course form for each)
  ☐ Delete courses from requirements or electives
  ☐ Add or modify concentration*
  ☐ Add or modify cognate*

*Note: Only concentrations and cognates requiring 18 or more credit hours will be tracked in Banner and Degree Works and noted on the transcript.

☐ Terminate Program (fill out E, G, H, and I)
  ☐ Terminate degree
  ☐ Terminate major
  ☐ Terminate concentration
  ☐ Terminate cognate

C. GENERAL INFORMATION

Number of Current Credit Hours (for existing program): 56+
Number of Proposed Credit Hours (for changed program): 58+
Catalog Year in which changes will take effect: FALL 2014

D. CURRICULUM. Please list every change you are making below AND attach the current Program of Study Worksheet for this major (http://registrar.cofc.edu/program-of-study-worksheets/index.php) with changes marked in RED. Additions should show where the course will be inserted, deletions should be noted by crossing out the course, and moves indicated with arrows. Distinguish between required and elective courses, and note any prerequisites, corequisites, sequencing, or other restrictions. Provide the catalog description and course list exactly as they should appear in the catalog. For each new course, submit the Curriculum Committee’s Course Form and a sample syllabus.

This form was last updated on 6/6/2013 and replaces all others.
SET 15: Change Program Form BS Chemistry

1) The 4-credit course 221/221L will be deactivated and replaced with a newly numbered 5 credit course set, Chem 220/Chem 220L.
2) The 4 credit course Math 220 will be removed as a major requirement and replaced with a new 5-credit course, Math 229.
3) Chem 511 will be deactivated and in its place, students will take the identical course, now numbered Chem 311.
4) Chem 512L will be deactivated and in its place, students will take the identical course, now numbered Chem 312L.
5) Chem 521 will be deactivated and in its place, students will take the identical course, now numbered Chem 421.
6) Chem 521L will be deactivated and in its place, students will take the identical course, now numbered Chem 421L.

E. RATIONALE AND EXPLANATION. Please provide a narrative addressing the request you are making and why you are making it.

The proposed new math course, Math 229, is a survey of math topics needed to understand physical chemistry. Topics in the course derive primarily from Math 221, but include topics from many other math courses such as differential equations and linear algebra. Students have been requesting better math preparation for the year-long sequence of Physical Chemistry for years. A recent survey of the math needed to excel in Physical Chemistry spans 11 different math courses. Thus, we collaborated with the math department to design a new course with carefully selected topics that include the essential elements of vector calculus in addition to other critical math skills. This is an assessment driven change, and a student requested change. We chose to expand a normal 4-credit course to a 5-credit course to allow time sufficient class time to cover a wider array of topics. This substitution is preferable over adding an additional math course to the major, which would greatly impact a student’s ability to finish the curriculum in 4 years.

The change in the credit hours for Chem 220/220L (formerly Chem 221/221L) reflects current practice for contact hours (3 lecture contact hours and 6 lab contact hours). Although it adds a credit hour to the major, it does not reflect an increase in current workload for the student. The change was requested to remedy the accounting of credit hours and teaching effort. A student will now receive a separate grade in lecture in lab.

We requested to change Chem 521/521L with a 4 credit/0 credit combination to Chem 421/421L with 3 credit/1 credit combination. It does not alter course requirements, but allows us to now assign a separate grade for lab.

Chem 511/512L are being renumbered to Chem 311/312L to better reflect the level that the course is taught.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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<td>1. The BS Chemistry major will demonstrate proficiency in the broader discipline of Chemistry.</td>
<td>How: Educational Testing Service Major Field Test in Chemistry which is administered each spring as part of the required Senior Seminar capstone in the major, CHEM</td>
</tr>
</tbody>
</table>

This form was last updated on 6/6/2013 and replaces all others. Page 2 of 5
| 2. The BS Chemistry major will demonstrate proficiency in one or more of the more narrowly defined sub-disciplines of Chemistry, which include Analytical, Biochemistry, Inorganic, Organic, or Physical chemistry. | How: Educational Testing Service Major Field Test in Chemistry which is administered each spring as part of the required Senior Seminar capstone in the major, CHEM 492.

When: CHEM 492 must be taken the spring semester immediately preceding graduation.

How well: We expect that, on average, our students will score at or above the 60% percentile on this instrument in terms of their overall score.

Who: All majors |
|---|---|
| 3. The BS Chemistry major will demonstrate a positive appreciation for the educational experiences received within our department. | How: Senior survey administered as part of the CHEM 492 course, response to these questions: “Your experience in the department has served you well in preparation for your anticipated career goals” & “My overall opinion of the Department of Chemistry and Biochemistry is that it is an excellent department” and senior survey administered by the College of Charleston should reflect high satisfaction with the major.

Who: All majors

When: Senior year

How well: >70% in College's exit senior survey in the area of overall academic experience and program of study.

>70% rate strongly agree to questions in our own survey. |
| 4. BS Chemistry majors achieve success in attaining career goals | How: The department will track student career intentions prior to leaving campus by using iBiosketch, required exit surveys, Facebook, and LinkedIn.

Who: All majors

When: Just prior to graduation and after graduation updates periodically |
5. The majority of BS Chemistry majors participate in research opportunities as a capstone experience.

<table>
<thead>
<tr>
<th>How well:</th>
<th>Our hope is that 75% of students desiring to stay in science will successfully be matriculated in a graduate program or will be successfully employed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>How:</td>
<td>We will track research participation by requiring mandatory safety training in all research courses and for summer research participation. We will catch outside research experiences via our required senior survey. We will assess if research participation ends in successful career outcomes based on student goals using iBiosketch, surveys, and communication with faculty working with students. Who: all majors</td>
</tr>
<tr>
<td>When:</td>
<td>tracking will occur primarily in senior year, but annual records are kept</td>
</tr>
<tr>
<td>How well:</td>
<td>We would like 75% or more of our majors to get a research experience</td>
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Additional Outcomes or Comments:

G. IMPACT ON EXISTING PROGRAMS AND COURSES. Please describe the impact of this request on other programs and courses. If you are deleting a program, please describe the effect on all programs that will be impacted; if you are adding or changing a program, please explain any overlap with existing programs at the College.

The change in credit-hour for Chem 220/220L affects Marine Biology majors who opt to take that class.

The change in math course requires that math regularly offer this course, something that they are prepared and willing to do.

H. COSTS ASSOCIATED WITH THE REQUESTED ACTION. List all of the new costs or cost savings (including new faculty/staff requests, library, or equipment) associated with your request.

The only change that could potentially cost more is that Math will now be offering an additional course. In reality, it will probably only shift enrollments from Math 220 to Math 229.
SET 15: Change Program Form BS Chemistry

I. CHECKLIST

☐ I have completed all relevant parts of the form.

☐ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ I have attached a Course Form for each newly-created or modified course.

☐ (For proposals that affect other departments in any way) I have attached an acknowledgement from the relevant department.

☐ I have provided the complete curriculum for the program, concentration, emphasis, etc., including the description and course list, exactly as it should appear in the catalog.

☐ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 16: Change Program Form BA Chemistry

FACULTY CURRICULUM COMMITTEE
CHANGE/DELETE PROGRAM FORM

Instructions:
- Please fill out all of the portions of the form that are specified in section B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, please start by checking the detailed instructions on the website.
- Please feel free to contact the committee chair with any remaining questions you might have.

A. CONTACT INFORMATION.

Name: Pam Riggs-Gelasco  Phone: 3-7455  Email: gelascop@cofc.edu

School: SSM  Department or Program: Chemistry and Biochemistry

Name and Acronym of Major: Chemistry CHEM

B. CATEGORY OF REVIEW. Please check all that apply, then fill out the specified parts of the form.

☒ Change Request (fill out all sections)
  ☒ Add an existing course to requirements or electives
  ☒ Add a new course to requirements or electives (attach completed course form for each)
  ☐ Delete courses from requirements or electives
  ☐ Add or modify concentration*
  ☐ Add or modify cognate*

*Note: Only concentrations and cognates requiring 18 or more credit hours will be tracked in Banner and Degree Works and noted on the transcript.

☐ Terminate Program (fill out E, G, H, and I)
  ☐ Terminate degree
  ☐ Terminate major
  ☐ Terminate concentration
  ☐ Terminate cognate

C. GENERAL INFORMATION

Number of Current Credit Hours (for existing program): 40+
Number of Proposed Credit Hours (for changed program): 42+
Catalog Year in which changes will take effect: FALL 2014

D. CURRICULUM. Please list every change you are making below AND attach the current Program of Study Worksheet for this major (http://registrar.cofc.edu/program-of-study-worksheets/index.php) with changes marked in RED. Additions should show where the course will be inserted, deletions should be noted by crossing out the course, and moves indicated with arrows. Distinguish between required and elective courses, and note any prerequisites, co-requisites, sequencing, or other restrictions. Provide the catalog description and course list exactly as they should appear in the catalog. For each new course, submit the Curriculum Committee’s Course Form and a sample syllabus.

This form was last updated on 6/6/2013 and replaces all others.
SET 16: Change Program Form BA Chemistry

1) The 4-credit course 221/221L will be deactivated and replaced with a newly numbered 5 credit course set, Chem 220/Chem 220L.
2) The 4 credit course Math 220 will be removed as a major requirement and replaced with a new 5-credit course, Math 229.
3) The numbers of many of the elective courses will change (511 changes to 311, 521 changes to 421, 512L changes to 312L, 522 changes to 422, 531 changes to 431)
4) Chem 441 (formerly 541) should be added to the elective list of courses acceptable for the BA.
5) Chem 526 and Chem 528 are being deactivated and should be removed from the elective list.

E. RATIONALE AND EXPLANATION. Please provide a narrative addressing the request you are making and why you are making it.

The proposed new math course, Math 229, is a survey of math topics needed to understand physical chemistry. Topics in the course derive primarily from Math 221, but include topics from many other math courses such as differential equations and linear algebra. Students have been requesting better math preparation for the year-long sequence of Physical Chemistry for years. A recent survey of the math needed to excel in Physical Chemistry spans 11 different math courses. Thus, we collaborated with the math department to design a new course with carefully selected topics that include the essential elements of vector calculus in addition to other critical math skills. This is an assessment driven change, and a student requested change. We chose to expand a normal 4-credit course to a 5-credit course to allow time sufficient class time to cover a wider array of topics. This substitution is preferable over adding an additional math course to the major, which would greatly impact a student’s ability to finish the curriculum in 4 years.

The change in the credit hours for Chem 220/220L (formerly Chem 221/221L) reflects current practice for contact hours (3 lecture contact hours and 6 lab contact hours). Although it adds a credit hour to the major, it does not reflect an increase in current workload for the student. The change was requested to remedy the accounting of credit hours and teaching effort. A student will now receive a separate grade in lecture in lab.

The following courses will have new numbers in order to clear out 500 level courses from our curriculum.

- 511 changes to 311
- 521 changes to 421
- 512L changes to 312L
- 522 changes to 422
- 531 changes to 431

Advanced Physical Chemistry (Chem 441, formerly Chem 541) should be added to the list of courses acceptable as an elective for the BA. Chem 528 and Chem 526 are being deactivated and must be removed from the list.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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This form was last updated on 6/6/2013 and replaces all others.
| 1. The BA Chemistry major will demonstrate proficiency in the broader discipline of Chemistry. | How: Educational Testing Service Major Field Test in Chemistry which is administered each spring as part of the required Senior Seminar capstone in the major, CHEM 492. CHEM 492 must be taken the spring semester immediately preceding graduation.  
Who: All majors  
When: Within final year of time at CofC  
How well: We expect that, on average, our students will score at or above the 50% percentile on this instrument in terms of their overall score. |
|---|---|
| 2. The BA Chemistry major will demonstrate proficiency in one or more of the more narrowly defined sub-disciplines of Chemistry, which include Analytical, Biochemistry, Inorganic, Organic, or Physical chemistry. | How: Educational Testing Service Major Field Test in Chemistry which is administered each spring as part of the required Senior Seminar capstone in the major, CHEM 492.  
When: CHEM 492 must be taken the spring semester immediately preceding graduation.  
How Well: We expect that, on average, our students will score at or above the 60% percentile on this instrument in terms of their score on at least one of the sub-disciplinary test areas. While the test does not have a biochemistry section, it does filter out and provide a score for the smaller number of biochemistry related questions.  
Who: all majors |
| 3. The BA Chemistry major will demonstrate a positive appreciation for the educational experiences received within our department. | How: Senior survey administered as part of the CHEM 492 course, response to these questions: “Your experience in the department has served you well in preparation for your anticipated career goals” & “My overall opinion of the Department of Chemistry and Biochemistry is that it is an excellent department” and senior survey administered by the College of Charleston should reflect high satisfaction with the major  
Who: All majors  
When: Senior year  
How well: >70% in College’s exit senior survey in the area of overall academic experience and program of study.  
>70% rate strongly agree to questions in our own survey. |
4. BA Chemistry majors achieve success in attaining career goals

| How: The department will track student career intentions prior to leaving campus by using iBiosketch, required exit surveys, Facebook, and LinkedIn. |
| Who: all majors |
| When: just prior to graduation and after graduation updates periodically |
| How well: Our hope is that 75% of students desiring to stay in science will successfully be matriculated in a graduate program or will be successfully employed. |

5. The majority of BA Chemistry majors participate in research opportunities as a capstone experience.

| How: We will track research participation by requiring mandatory safety training in all research courses and for summer research participation. We will catch outside research experiences via our required senior survey. We will assess if research participation ends in successful career outcomes based on student goals using iBiosketch, surveys, and communication with faculty working with students. |
| Who: all majors |
| When: tracking will occur primarily in senior year, but annual records are kept |
| How well: We would like 75% or more of our majors to get a research experience |

Additional Outcomes or Comments:

G. IMPACT ON EXISTING PROGRAMS AND COURSES. Please describe the impact of this request on other programs and courses. If you are deleting a program, please describe the effect on all programs that will be impacted; if you are adding or changing a program, please explain any overlap with existing programs at the College.

The change in credit-hour for Chem 220/220L affects Marine Biology majors who opt to take that class.

The change in math course requires that math regularly offer this course, something that they are prepared and willing to do.
H. COSTS ASSOCIATED WITH THE REQUESTED ACTION. List all of the new costs or cost savings (including new faculty/staff requests, library, or equipment) associated with your request.

The only change that could potentially cost more is that Math will now be offering an additional course. In reality, it will probably only shift enrollments from Math 220 to Math 229.

I. CHECKLIST

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☒ I have attached a Course Form for each newly-created or modified course.

☒ (For proposals that affect other departments in any way) I have attached an acknowledgement from the relevant department.

☒ I have provided the complete curriculum for the program, concentration, emphasis, etc., including the description and course list, exactly as it should appear in the catalog.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
SET 17: Change Program Form Chemistry Minor

FACULTY CURRICULUM COMMITTEE
CHANGE/DELETE PROGRAM FORM

Instructions:
- Please fill out all of the portions of the form that are specified in section B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, please start by checking the detailed instructions on the website.
- Please feel free to contact the committee chair with any remaining questions you might have.

A. CONTACT INFORMATION.

Name: Pam Riggs-Gelasco Phone: 3-7455 Email: gelascop@cofc.edu
School: SSM Department or Program: Chemistry and Biochemistry
Name and Acronym of Major: Chemistry BS; CHEM

B. CATEGORY OF REVIEW. Please check all that apply, then fill out the specified parts of the form.

☒ Change Request (fill out all sections)
  ☒ Add an existing course to requirements or electives
  ☐ Add a new course to requirements or electives (attach completed course form for each)
  ☐ Delete courses from requirements or electives
  ☐ Add or modify concentration*
  ☐ Add or modify cognate*

*Note: Only concentrations and cognates requiring 18 or more credit hours will be tracked in Banner and Degree Works and noted on the transcript.

☐ Terminate Program (fill out E, G, H, and I)
  ☐ Terminate degree
  ☐ Terminate major
  ☐ Terminate concentration
  ☐ Terminate cognate

C. GENERAL INFORMATION

Number of Current Credit Hours (for existing program): 23
Number of Proposed Credit Hours (for changed program): 24
Catalog Year in which changes will take effect: FALL 2014

D. CURRICULUM. Please list every change you are making below AND attach the current Program of Study Worksheet for this major (http://registrar.cofc.edu/program-of-study-worksheets/index.php) with changes marked in RED. Additions should show where the course will be inserted, deletions should be noted by crossing out the course, and moves indicated with arrows. Distinguish between required and elective courses, and note any prerequisites, co-requisites, sequencing, or other restrictions. Provide the catalog description and course list exactly as they should appear in the catalog. For each new course, submit the Curriculum Committee’s Course Form and a sample syllabus.

This form was last updated on 6/6/2013 and replaces all others.
SET 17: Change Program Form Chemistry Minor

1) The 4-credit course 221/221L will be deactivated and replaced with a newly numbered 5 credit course set, Chem 220/Chem 220L.

E. RATIONALE AND EXPLANATION. Please provide a narrative addressing the request you are making and why you are making it.

The change in the credit hours for Chem 220/220L (formerly Chem 221/221L) reflects current practice for contact hours (3 lecture contact hours and 6 lab contact hours). Although it adds a credit hour to the major, it does not reflect an increase in current workload for the student. The change was requested to remedy the accounting of credit hours and teaching effort. A student will now receive a separate grade in lecture in lab.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

<table>
<thead>
<tr>
<th>Student Learning Outcomes</th>
<th>Assessment Method and Performance Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What will students know and be able to do when they complete the major or program?</td>
<td>How will each outcome be measured? Who will be assessed, when, and how often? How well should students be able to do on the assessment?</td>
</tr>
</tbody>
</table>
| 1. The Chemistry minor will demonstrate proficiency in general chemistry AND either organic chemistry or physical chemistry. | How: ACS exam scores will be collected for Chem 111/Chem 112 for each student enrolled. ACS exam scores for organic chemistry will be collected for Chem 231/Chem 232. ACS exam scores will be collected for Chem 341/342.  
Who: All students enrolled in these courses  
When: Within final year of time at CoC  
How well: We expect that, on average, our students will score at or above the 50% percentile on this instrument in terms of their overall score. |

This form was last updated on 6/6/2013 and replaces all others.
SET 17: Change Program Form Chemistry Minor

Additional Outcomes or Comments:

G. IMPACT ON EXISTING PROGRAMS AND COURSES. Please describe the impact of this request on other programs and courses. If you are deleting a program, please describe the effect on all programs that will be impacted; if you are adding or changing a program, please explain any overlap with existing programs at the College.

The change in credit-hour for Chem 220/220L affects Marine Biology majors who opt to take that class.

H. COSTS ASSOCIATED WITH THE REQUESTED ACTION. List all of the new costs or cost savings (including new faculty/staff requests, library, or equipment) associated with your request.

I. CHECKLIST

☒ I have completed all relevant parts of the form.

☒ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☒ I have attached a Course Form for each newly-created or modified course.

☒ (For proposals that affect other departments in any way) I have attached an acknowledgement from the relevant department.

☒ I have provided the complete curriculum for the program, concentration, emphasis, etc., including the description and course list, exactly as it should appear in the catalog.

☒ I have submitted one Signature Form that lists all of the different forms I am submitting.
Re: Chemistry curriculum changes that affect Biology

Hillenius, Willem Jacob

To: Figge-Gelacco, Pamela Jr.

Wednesday, November 20, 2013 3:01 PM

Dear Pam,
The Department of Biology discussed these proposed changes today at our faculty meeting. We have no objections to these changes, and support your department's efforts to strengthen its curriculum.

Sincerely,
Jaap

Jaap Hillenius
Professor & Chair
Department of Biology
College of Charleston
66 George Street
Charleston, SC 29424
USA

T: (843) 953-5504
F: (843) 953-5453
E: hilleniusw@cofc.edu
Re: Chemistry curriculum changes that affect Biology

Hillenius, Willem Jacob

To: Flynt-Giacco, Pamela Jo

Wednesday, November 22, 2019 3:41 PM

Jaap,

Attached are two documents that explain the proposed changes in the Biochemistry degree and proposed course changes that affect biology majors. Briefly, here are the changes that affect your department:

1) Quantitative Analysis will go from 4 credits to 5 credits to reflect the current practice of 3 contact hours of lecture and 6 contact hours of lab. In addition, a separate grade will be assigned in lecture (3 credits) and lab (2 credits). This affects your marine biology majors who opt to take that class instead of the organic sequence. It does not reflect a real change in the course or in current practice. Up to now, students and faculty have not been getting appropriate credit for the number of contact hours in the course.

2) Biochemistry Lab (Chem 354) will no longer have a pre-req of Chem 351 (Biochemistry lecture I). Instead, we will encourage both biochemistry majors and Biology Molec Track majors to take Chem 354 WITH Chem 351. However, they will not be co-requisites, to encourage more chemists and biologists and pre-med students to take the material in lecture. The new pre-req for Chem 354 would be Chem 232/Chem 232L. The course content of 354 is not changing. This affects your Molec Track majors, hopefully in a positive way that gives them more flexibility in planning their schedules.

3) As a result of our most recent 5-year review, the biochemistry degree must undergo restructuring if we want to keep American Chemical Society accreditation. This accreditation is important for students to be competitive for jobs and for graduate schools when they leave here and it is also important for the reputation of the department. For a degree to be ACS certified, students must have 400 lab contact hours beyond general chemistry and these must be centered in Chemistry courses or courses with heavy chemical content (judged by submission of syllabi and final exams during our last review). In addition, we are expecting ACS to announce the requirement of a capstone course this year. To address these requirements while minimizing undue burden on the student, we have biochemistry students will now take a menu of lab courses (which now includes our research courses) in order to get their # of lab hours up to 400. They will have a menu of capstone lecture courses as well. This eliminates the "4th elective class taken in Biology" (Micro, Cell, Physiology, or Genetics) for the biochemistry major. While we would anticipate that a few biochemistry students would still want to take these courses as preparation for medical school, hopefully it will free up spots in those courses for your own majors. ACS approved Molecular Biology as sufficiently chemical and we would like our majors to continue taking Bio 312/312L as part of their degree requirement, in addition to Biol 111 and Biol 112. I hope your department would still be willing to let these students register for these upper level courses (required or elective) without Math 250 on a case by case basis; the biochemistry students do get statistics in Chem 221 (soon to be Chem 220) in addition to lots of calculus, so it seems like a logical exception. The median grade of biochemistry majors in the elective biology classes is 3.7, so they seem to manage without the Math 250, at least in those courses.

If you could forward this email and the attached documents to the faculty in your department, I would appreciate it. I would be happy to discuss all of this at one of your department meetings if you feel that is necessary for your support.
SET 19: Change Program Form BA Chemistry with Cognate in Secondary Ed

FACULTY CURRICULUM COMMITTEE
CHANGE/DELETE PROGRAM FORM

Instructions:
- Please fill out all of the portions of the form that are specified in section B. You must do this before your request can move forward!
- Remember that your changes will not be implemented until the next catalog year at the earliest.
- If you have questions, please start by checking the detailed instructions on the website.
- Please feel free to contact the committee chair with any remaining questions you might have.

A. CONTACT INFORMATION.

Name: Pam Rigg-Gelasco Phone: 3-7455 Email: gelascop@cofc.edu

School: SSM Department or Program: Chemistry and Biochemistry

Name and Acronym of Major: Chemistry BS; CHEM

B. CATEGORY OF REVIEW. Please check all that apply, then fill out the specified parts of the form.

☒ Change Request (fill out all sections)
☒ Add an existing course to requirements or electives
☒ Add a new course to requirements or electives (attach completed course form for each)
☐ Delete courses from requirements or electives
☐ Add or modify concentration*
☐ Add or modify cognate*

*Note: Only concentrations and cognates requiring 18 or more credit hours will be tracked in Banner and Degree Works and noted on the transcript.

☐ Terminate Program (fill out E, G, H, and I)
☐ Terminate degree
☐ Terminate major
☐ Terminate concentration
☐ Terminate cognate

C. GENERAL INFORMATION

Number of Current Credit Hours (for existing program): 84+
Number of Proposed Credit Hours (for changed program): 86+
Catalog Year in which changes will take effect: FALL 2014

D. CURRICULUM. Please list every change you are making below AND attach the current Program of Study Worksheet for this major (http://registrar.cofc.edu/program-of-study-worksheets/index.php) with changes marked in RED. Additions should show where the course will be inserted, deletions should be noted by crossing out the course, and moves indicated with arrows. Distinguish between required and elective courses, and note any prerequisites, corequisites, sequencing, or other restrictions. Provide the catalog description and course list exactly as they should appear in the catalog. For each new course, submit the Curriculum Committee’s Course Form and a sample syllabus.

This form was last updated on 6/6/2013 and replaces all others.
SET 19: Change Program Form BA Chemistry with Cognate in Secondary Ed

1) The 4-credit course 221/221L will be deactivated and replaced with a newly numbered 5-credit course set, Chem 220/Chem 220L.
2) The 4-credit course Math 220 will be removed as a major requirement and replaced with a new 5-credit course, Math 229.
3) The numbers of many of the elective courses will change (511 changes to 311, 521 changes to 421, 512L changes to 312L, 522 changes to 422, 531 changes to 431)
4) Chem 441 (formerly 541) should be added to the elective list of courses acceptable for the BA.
5) Chem 526 and Chem 528 are being deactivated and should be removed from the elective list.

E. RATIONALE AND EXPLANATION. Please provide a narrative addressing the request you are making and why you are making it.

The proposed new math course, Math 229, is a survey of math topics needed to understand physical chemistry. Topics in the course derive primarily from Math 221, but include topics from many other math courses such as differential equations and linear algebra. Students have been requesting better math preparation for the year-long sequence of Physical Chemistry for years. A recent survey of the math needed to excel in Physical Chemistry spans 11 different math courses. Thus, we collaborated with the math department to design a new course with carefully selected topics that include the essential elements of vector calculus in addition to other critical math skills. This is an assessment driven change, and a student requested change. We chose to expand a normal 4-credit course to a 5-credit course to allow time sufficient class time to cover a wider array of topics. This substitution is preferable over adding an additional math course to the major, which would greatly impact a student’s ability to finish the curriculum in 4 years.

The change in the credit hours for Chem 220/220L (formerly Chem 221/221L) reflects current practice for contact hours (3 lecture contact hours and 6 lab contact hours). Although it adds a credit hour to the major, it does not reflect an increase in current workload for the student. The change was requested to remedy the accounting of credit hours and teaching effort. A student will now receive a separate grade in lecture in lab.

The following courses will have new numbers in order to clear out 500 level courses from our curriculum.

- 511 changes to 311
- 521 changes to 421
- 512L changes to 312L
- 522 changes to 422
- 531 changes to 431

Advanced Physical Chemistry (Chem 441, formerly Chem 541) should be added to the list of courses acceptable as an elective for the BA. Chem 528 and Chem 526 are being deactivated and must be removed from the list.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT.

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| **1.** The BA Chemistry major will demonstrate proficiency in the broader discipline of Chemistry. | **How:** Educational Testing Service Major Field Test in Chemistry which is administered each spring as part of the required Senior Seminar capstone in the major, CHEM 492. CHEM 492 must be taken the spring semester immediately preceding graduation.  
**Who:** All majors  
**When:** Within final year of time at CofC  
**How well:** We expect that, on average, our students will score at or above the 50% percentile on this instrument in terms of their overall score. |
| **2.** The BA Chemistry major will demonstrate proficiency in one or more of the more narrowly defined sub-disciplines of Chemistry, which include Analytical, Biochemistry, Inorganic, Organic, or Physical chemistry. | **How:** Educational Testing Service Major Field Test in Chemistry which is administered each spring as part of the required Senior Seminar capstone in the major, CHEM 492.  
**When:** CHEM 492 must be taken the spring semester immediately preceding graduation.  
**How Well:** We expect that, on average, our students will score at or above the 60% percentile on this instrument in terms of their score on at least one of the sub-disciplinary test areas. While the test does not have a biochemistry section, it does filter out and provide a score for the smaller number of biochemistry related questions.  
**Who:** all majors |
| **3.** The BA Chemistry major will demonstrate a positive appreciation for the educational experiences received within our department. | **How:** Senior survey administered as part of the CHEM 492 course, response to these questions: “Your experience in the department has served you well in preparation for your anticipated career goals” & “My overall opinion of the Department of Chemistry and Biochemistry is that it is an excellent department” and senior survey administered by the College of Charleston should reflect high satisfaction with the major  
**Who:** All majors  
**When:** Senior year  
**How well:** >70% in College’s exit senior survey in the area of overall academic experience and program of study.  
>70% rate strongly agree to questions in our own survey. |

This form was last updated on 6/6/2013 and replaces all others.
4. BA Chemistry major achieves success in attaining career goals

<table>
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<th>How: The department will track student career intentions prior to leaving campus by using iBiosketch, required exit surveys, Facebook, and LinkedIn.</th>
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<td>How well: Our hope is that 75% of students desiring to stay in science will successfully be matriculated in a graduate program or will be successfully employed.</td>
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5. The majority of BA Chemistry majors participate in research opportunities as a capstone experience.

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Additional Outcomes or Comments:

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G. IMPACT ON EXISTING PROGRAMS AND COURSES. Please describe the impact of this request on other programs and courses. If you are deleting a program, please describe the effect on all programs that will be impacted; if you are adding or changing a program, please explain any overlap with existing programs at the College.

The change in credit-hour for Chem 220/220L affects Marine Biology majors who opt to take that class.

The change in math course requires that math regularly offer this course, something that they are prepared and willing to do.
H. COSTS ASSOCIATED WITH THE REQUESTED ACTION. List all of the new costs or cost savings (including new faculty/staff requests, library, or equipment) associated with your request.

The only change that could potentially cost more is that Math will now be offering an additional course. In reality, it will probably only shift enrollments from Math 220 to Math 229.

I. CHECKLIST

☐ I have completed all relevant parts of the form.

☐ I have attached a cover letter that describes my request and lists all the documents I am submitting.

☐ I have attached a Course Form for each newly-created or modified course.

☐ (For proposals that affect other departments in any way) I have attached an acknowledgement from the relevant department.

☐ I have provided the complete curriculum for the program, concentration, emphasis, etc., including the description and course list, exactly as it should appear in the catalog.

☐ I have submitted one Signature Form that lists all of the different forms I am submitting.
Re: chemistry major changes

Van Sickle, Meta L.

To: Riggs-Gelasco, Pamela Jo

Thanks Pam, I received the changes to the content major information for future chemistry teachers. We support the recommended changes to the major.

meta

From: <Riggs-Gelasco>, Pamela Jo <GelascoR@cofc.edu>
Date: Wednesday, December 4, 2013 11:54 AM
To: acts <vansicklem@cofc.edu>
Subject: chemistry major changes

Meta,

We are changing a few classes in chemistry that affect the Chemistry and Biochemistry Teacher Education Program. Primarily, we are swapping Calc II-4 credits with a new math class "Vector Calculus" that will be 3 credits. Also, Quant will be made a 5 credit class to match the contact hours we currently have (3 lecture and 5 lab). These are adding 2 credit hours to the BA major (which underpins the teacher education program).

Can you acknowledge for me (or Curriculum committee)? I am attaching the updated Program Worksheet to summarize some other minor things.

Pam
SET 20—Program of Study Sheet BS Chemistry

Chemistry Major Requirements
Catalog Year: 2014-15
Degree: Bachelor of Science
Credit Hours: 58+

“PR” indicates a pre-requisite. “CO” indicates a co-requisite.

Courses within this major may also satisfy general education requirements. Please consult http://registrar.cofc.edu/general-edu for more information.

Required Courses

☐ CHEM 111 Principles of Chemistry (3) PR: MATH 111 or equivalent; CO: CHEM 111L
☐ CHEM 111L Principles of Chemistry Lab (1) CO: CHEM 111

☐ CHEM 112 Principles of Chemistry (3) PR: CHEM 111, CHEM 111L or HONS 153, HONS 153L or HONS 191 or 191L; CO: CHEM 112L
☐ CHEM 112L Principles of Chemistry Lab (1) CO: CHEM 112

☐ CHEM 221 Quantitative Analysis (5) PR: CHEM 112, CHEM 112L or HONS 154, HONS 154L or HONS 294, HONS 294L; CO: CHEM 221L
☐ CHEM 221L Quantitative Analysis Laboratory (0) CO: CHEM 221

☐ CHEM 231 Organic Chemistry (3) PR: CHEM 112, CHEM 112L or HONS 154, HONS 154L; CO: CHEM 231L
☐ CHEM 231L Introduction to Organic Chemistry Laboratory Techniques (1) CO: CHEM 231

☐ CHEM 232 Organic Chemistry (3) PR: CHEM 231, CHEM 231L; CO: CHEM 232L
☐ CHEM 232L Organic Synthesis and Analysis (1) CO: CHEM 232

☐ CHEM 341 Physical Organic Chemistry I: Spectroscopy and Reaction Rates (3) PR: CHEM 221, CHEM 221L and MATH 221; CO: CHEM 341L (MATH 221 is strongly recommended.)
☐ CHEM 341L Physical Organic Chemistry I: Spectroscopy and Reaction Rates Laboratory (1) CO: CHEM 341

☐ CHEM 342 Physical Organic Chemistry II: Structure and Reactivity (3) PR: CHEM 341, CHEM 341L; CO: CHEM 342L
☐ CHEM 342L Physical Organic Chemistry II: Structure and Reactivity Laboratory (1) CO: CHEM 342

☐ CHEM 351 Biochemistry (3) PR: CHEM 232, CHEM 232L

☐ CHEM 371 Chemical Synthesis Character (3) PR: CHEM 232, CHEM 232L, CHEM 232, CHEM 232L
☐ CHEM 371L Chemical Synthesis and Characterization Laboratory (0) CO: CHEM 371

☐ CHEM 490 Chemistry and Biochemistry Seminar (1) PR: Junior or senior standing

☐ CHEM 492 Senior Seminar (1) PR: CHEM 341 and senior standing

☐ CHEM 311 Advanced Inorganic Chemistry (3) PR or CO: CHEM 341, CHEM 341L and CHEM 342, CHEM 342L
☐ CHEM 312L Advanced Inorganic Chemistry Laboratory (1) PR or CO: CHEM 511

☐ CHEM 521 Instrumental Analysis (4) PR: CHEM 221, CHEM 221L; CO: CHEM 521L
☐ CHEM 521L Instrumental Analysis (0) CO: CHEM 521

Physics Requirement

☐ PHYS 111 General Physics I (3) PR or CO: MATH 120 or equivalent or instructor permission; CO: PHYS 111L
☐ PHYS 111L General Physics I Lab (1) CO: PHYS 111
SET 20---Program of Study Sheet BS Chemistry

- PHYS 112 General Physics II (3) PR: PHYS 111 or HONS 157; CO or PR: MATH 220 or equivalent or instructor permission; CO: PHYS 112L
- PHYS 112L General Physics II Lab (1) CO: PHYS 112

Math Requirement

- MATH 120 Introductory Calculus (4) PR: Placement or C- or better in MATH 111
- MATH 225 Vector Calculus for Science and Engineering (4) PR: MATH 120 or HONS 115

Notes:

- Computer Programming I (CSCI 220 and 220L) is strongly recommended.
- MATH 225 Calculus III is recommended for students who want to go to graduate school.
- Honors students can take the alternative sequence of HONS 191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM 111/111L, CHEM 112/112L, CHEM 231/231L, and CHEM 232/232L. Please note in this case CHEM 221 cannot be taken until CHEM 294/294L is complete.
- All junior and senior chemistry majors are strongly encouraged to attend the scheduled departmental seminars.
- Students who have completed PHYS 101 Introductory Physics I and PHYS 102 Introductory Physics II before declaring a chemistry or biochemistry major may satisfy this requirement by taking additional related courses. Please see the department chair for the list of courses.
Chemistry Major Requirements
Catalog Year: 2014-15
Degree: Bachelor of Arts
Credit Hours: 42+

"PR" indicates a pre-requisite. "CO" indicates a co-requisite.

Courses within this major may also satisfy general education requirements. Please consult http://registrar.cofc.edu/general-edu for more information.

Required Courses

☐ CHEM 111 Principles of Chemistry (3) PR: MATH 111 or equivalent; CO: CHEM 111L
☐ CHEM 111L Principles of Chemistry Lab (1) CO: CHEM 111

☐ CHEM 112 Principles of Chemistry (3) PR: CHEM 111, CHEM 111L or HONS 153, HONS 153L; CO: CHEM 112L
☐ CHEM 112L Principles of Chemistry Lab (1) CO: CHEM 112

☐ CHEM 222 Quantitative Analysis (4) PR: CHEM 112, CHEM 112L or HONS 154, HONS 154L; CO: CHEM 222L
☐ CHEM 222L Quantitative Analysis Laboratory (0) CO: CHEM 222

☐ CHEM 231 Organic Chemistry (3) PR: CHEM 112, CHEM 112L or HONS 154, HONS 154L; CO: CHEM 231L
☐ CHEM 231L Introduction to Organic Chemistry Laboratory Techniques (1) CO: CHEM 231

☐ CHEM 232 Organic Chemistry (3) PR: CHEM 231, CHEM 231L; CO: CHEM 232L
☐ CHEM 232L Organic Synthesis and Analysis (1) CO: CHEM 232

☐ CHEM 341 Quantum Chemistry and Spectroscopy (3) PR: CHEM 222 and MATH 225; CO: CHEM 341L (MATH 225 is strongly recommended.)
☐ CHEM 341L Quantum Chemistry and Spectroscopy Laboratory (1) CO: CHEM 341

☐ CHEM 342 Quantum Chemistry and Spectroscopy (3) PR: CHEM 341, CHEM 341L; PR: CHEM 222/222L and MATH 225, CO: CHEM 342L

☐ CHEM 342L Quantum Chemistry and Spectroscopy Laboratory (1) CO: CHEM 342

☐ CHEM 492 Senior Seminar (1) PR: CHEM 341 and senior standing

Additional Chemistry Elective: Select 3 credit hours from any 300-level or above CHEM course excluding CHEM 583.

☐ __________

CHEM 343 Introduction to Modeling in Chemistry (1) PR: CHEM 231, CHEM 231L

CHEM 351 Biochemistry (3) PR: CHEM 232, CHEM 232L

CHEM 352 Biochemistry (3) PR: CHEM 351

CHEM 354 Biochemistry Laboratory (1) PR: CHEM 351

CHEM 371 Chemical Synthesis Character (3) PR: CHEM 221, CHEM 221L, CHEM 232, CHEM 232L

CHEM 381* Internship (1, repeatable up to 4) PR: Junior or senior standing and at least a 2.50 GPA both overall and in major

CHEM 399* Tutorial (3; repeatable up to 12) PR: Junior or senior standing and at least a 2.50 GPA both overall and in major

CHEM 481 Introductory Research (2) PR: Instructor permission

CHEM 482 Introductory Research II (2) PR: Instructor permission
CHEM 490  Chemistry and Biochemistry Seminar (1) PR: Junior or senior standing

CHEM 311  Advanced Inorganic Chemistry (3) PR or CO: CHEM 341, CHEM 341L and CHEM 342, CHEM 342L

CHEM 312L  Advanced Inorganic Chemistry Laboratory (1) PR or CO: CHEM 511

CHEM 321  Instrumental Analysis (4) PR: CHEM 221, CHEM 221L; CO: CHEM 521L

CHEM 321L  Instrumental Analysis (0)

CHEM 322  Environmental Chemistry (3) PR: CHEM 221; CO: CHEM 522L

CHEM 322L  Environmental Chemistry Laboratory (1) CO: CHFM 522

CHEM 526  Introduction to Nuclear and Radiochemistry (1) PR: CHEM 221, CHEM 221L OR CHEM 231, CHEM 234L

CHEM 528  Nuclear and Radiochemistry (3) PR: CHEM 224 or CHEM 234

CHEM 331  Advanced Organic Chemistry (3) PR: CHEM 232, CHEM 232L

Notes: *CHEM 381 is repeatable up to 4 credit hours earned. *CHEM 399 is repeatable up to 12 credit hours earned.

Math Requirement

☐ MATH 120  Introductory Calculus (4) PR: Placement or C- or better in MATH 111

☐ MATH 221  PR: MATH 120 or HONS 115

Notes:

- MATH 220 Calculus II is strongly recommended for students who wish to go to graduate school

- Honors students can take the alternative sequence of HONS 191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM 111/111L, CHEM 112/112L, CHEM 231/231L, and CHEM 232/232L. Please note in this case CHEM 221 cannot be taken until CHEM 294/294L is complete.

- All junior and senior chemistry majors are strongly encouraged to attend the scheduled departmental seminars.

- Students who have completed PHYS 101 Introductory Physics I and PHYS 102 Introductory Physics II before declaring a chemistry or biochemistry major may satisfy this requirement by taking additional related courses. Please see the department chair for the list of courses.
Biochemistry Major Requirements
Catalog Year: 2014-15
Degree: Bachelor of Science
Credit Hours: 72-74

"PR" indicates a pre-requisite. "CO" indicates a co-requisite.

Courses within this major may also satisfy general education requirements. Please consult http://registrar.cofc.edu/general-edu for more information.

Required Courses

☐ CHEM 111 Principles of Chemistry (3) PR: MATH 111 or equivalent; CO: CHEM 111L
☐ CHEM 111L Principles of Chemistry Lab (1) CO: CHEM 111

☐ CHEM 112 Principles of Chemistry (3) PR: CHEM 111, CHEM 111L or HONS 153, HONS 153L or HONS 191, HONS 191L; CO: CHEM 112L
☐ CHEM 112L Principles of Chemistry Lab (1) CO: CHEM 112

☐ CHEM 221 Quantitative Analysis (3) PR: CHEM 112, CHEM 112L or HONS 154, HONS 154L or HONS 294, HONS 294L; CO: CHEM 221L
☐ CHEM 221L Quantitative Analysis Laboratory (0) CO: CHEM 221

☐ CHEM 231 Organic Chemistry (3) PR: CHEM 112, CHEM 112L or HONS 154, HONS 154L; CO: CHEM 231L
☐ CHEM 231L Introduction to Organic Chemistry Laboratory Techniques (1) CO: CHEM 231

☐ CHEM 232 Organic Chemistry (3) PR: CHEM 231, CHEM 231L; CO: CHEM 232L
☐ CHEM 232L Organic Synthesis and Analysis (1) CO: CHEM 232

☐ CHEM 341 Instrumental Analysis (3) PR: CHEM 221, CHEM 221L and MATH 221; CO: CHEM 341L
☐ CHEM 341L Instrumental Analysis Laboratory (1) CO: CHEM 341

☐ CHEM 342 Quantum Chemistry and Spectroscopy (3) PR: CHEM 341, CHEM 341L PR: CHEM 221 and MATH 221; CO: CHEM 342L
☐ CHEM 342L Quantum Chemistry and Spectroscopy Laboratory (1) CO: CHEM 342

☐ CHEM 351 Biochemistry (3) PR: CHEM 232, CHEM 232L

☐ CHEM 352 Biochemistry II (3) PR: CHEM 351

☐ CHEM 354L Biochemistry Lab (1) PR: CHEM 351

☐ CHEM 490 Chemistry and Biochemistry Seminar (1) PR: Junior or senior standing

☐ CHEM 492 Senior Seminar (1) PR: CHEM 341 and senior standing

☐ CHEM 111 Advanced Inorganic Chemistry (3) PR or CO: CHEM 221L

☐ Select 2 of the following courses that total a minimum of 11 credit hours: CHEM 155, CHEM 177, CHEM 481, CHEM 483, CHEM 112L, CHEM 421L, CHEM 422L

☐ Biology Requirement
SET 20—Program Study Worksheet BS Biochemistry

☐ BIOL 111 Introduction to Cell and Molecular Biology (3) PR: None; CO: BIOL 111L
☐ BIOL 111L Introduction to Cell and Molecular Biology Lab (1) CO: BIOL 111

OR
☐ HONS 151 Honors Biology I (3) PR: None; CO: HONS 151L
☐ HONS 151L Honors Biology I Lab (1) CO: HONS 151

☐ BIOL 112 Evolution, Form, and Function of Organisms (3) PR: BIOL 111 and 111L; CO: BIOL 112L
☐ BIOL 112L Evolution, Form, and Function of Organisms Lab (1) CO: BIOL 112

OR
☐ HONS 152 Honors Biology II (3) PR: HONS 151 and 151L; CO: HONS 152L
☐ HONS 152L Honors Biology II Lab (1) CO: HONS 152

☐ BIOL 312 Molecular Biology (3) PR: BIOL 111 and 111L or HONS 151 and 151L and BIOL 112 and 112L or HONS 152 and 152L; BIOL 211 and 211D and BIOL 305 or CHEM 232 and 232L; and CHEM 111 and 111L and CHEM 112 and 112L; PR or CO: MATH 250 or instructor permission for biochemistry majors

☐ BIOL 312L Molecular Biology Laboratory (1) PR or CR: BIOL 312 and MATH 250 or instructor permission for biochemistry majors

Select 4 credit hours from the following Biology courses:

☐ BIOL 314 General Microbiology (4)
☐ BIOL 315 Cellular and Molecular Biology (4)
☐ BIOL 316 Research Methods in Zoology and Entomology (2)

Physics Requirement

☐ PHYS 111 General Physics I (3) PR or CO: MATH 120 or equivalent or instructor permission; CO: PHYS 111L
☐ PHYS 111L General Physics I Lab (1) CO: PHYS 111

☐ PHYS 112 General Physics II (3) PR: PHYS 111 or HONS 157; CO or PR: MATH 220 or equivalent or instructor permission; CO: PHYS 112L
☐ PHYS 112L General Physics II Lab (1) CO: PHYS 112

Mathematics Requirement
SET 20—Program Study Worksheet BS Biochemistry

☐ MATH 120  Introductory Calculus (4) PR: Placement or C- or better in MATH 111

☐ MATH 220  Calculus II (4) PR: MATH 120 or HONS-115

Notes:

- MATH 250 is a pre-requisite for all 300-level BIOL courses but can be waived with instructor permission for biochemistry majors.

- Honors students can take the alternative sequence of HONS191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM111/111L, CHEM112/112L, CHEM 231/231L, and CHEM 232/232L.

- Honors students can take the alternative sequence of HONS 157/HONS 157L and HONS 158/HONS 158L in lieu of PHYS 111/111L and PHYS112/112L.

- All junior and senior chemistry majors are strongly encouraged to attend the scheduled department seminars.

- Students who have completed PHYS 101 Introductory Physics I and PHYS 102 Introductory Physics II before declaring a chemistry or biochemistry major may satisfy this requirement by taking additional related courses. Please see the department chair for the list of courses.
SET 20: Program Worksheet CHEM-EDCH

Chemistry Major and Secondary Cognate Major Requirements
Catalog Year: 2014-15
Degree: Bachelor of Arts
Credit Hours: 84+ (Chemistry 42+; Secondary Cognate 44)

"PR" indicates a pre-requisite. "CO" indicates a co-requisite.

Courses within this major may also satisfy general education requirements. Please consult http://registrar.cofc.edu/general-edu for more information.

Chemistry Teacher Education Program (Grades 9-12)

Students interested in teacher certification in chemistry must complete both the chemistry major and the secondary education cognate major requirements. See the School of Education, Health and Human Performance section of the undergraduate catalog for a listing of the required secondary education cognate major courses. Students should apply for acceptance to this program no later than the second semester of their sophomore year. Requirements for this include admission to and successful completion of the approved teacher education program. Students must successfully complete all requirements for certification in secondary education.

When declaring teacher certification in chemistry through the Program of Study Management System (POSM), students must first select "Declare or Add a Major" and then "Secondary Education Cognate" from the major list. Once this selection is made, a second menu box will appear with a list of the associated majors. Select the chemistry major and follow the on-screen instructions.

Required Courses

- CHEM 111 Principles of Chemistry (3) PR: MATH 111 or equivalent; CO: CHEM 111L
- CHEM 111L Principles of Chemistry Lab (1) CO: CHEM 111

- CHEM 211 Principles of Chemistry (3) PR: CHEM 111, CHEM 111L or HONS 153, HONS 153L; CO: CHEM 211L
- CHEM 211L Principles of Chemistry Lab (1) CO: CHEM 211

- CHEM 221 Quantitative Analysis (4) PR: CHEM 112, CHEM 112L or HONS 154, HONS 154L; CO: CHEM 221L
- CHEM 221L Quantitative Analysis Laboratory (0) CO: CHEM 221

- CHEM 231 Organic Chemistry (3) PR: CHEM 112, CHEM 112L or HONS 154, HONS 154L; CO: CHEM 231L
- CHEM 231L Introduction to Organic Chemistry Laboratory Techniques (1) CO: CHEM 231

- CHEM 232 Organic Chemistry (3) PR: CHEM 231, CHEM 231L; CO: CHEM 232L
- CHEM 232L Organic Synthesis and Analysis (1) CO: CHEM 232

- CHEM 341 Physical Chemistry (3) PR: CHEM 221 and MATH 221; CO: CHEM 341L (MATH 221 is strongly recommended)
- CHEM 341L Physical Chemistry Laboratory (1) CO: CHEM 341

- CHEM 342 Physical Chemistry (3) PR: CHEM 221 and MATH 221; CO: CHEM 342L
- CHEM 342L Physical Chemistry Laboratory (1) CO: CHEM 342

- CHEM 492 Senior Seminar (1) PR: CHEM 341 and senior standing

Additional Chemistry Elective: Select 3 credit hours from any 300-level or above CHEM course excluding CHEM 583.

- CHEM 343 Introduction to Modeling in Chemistry (1) PR: CHEM 231, CHEM 231L

CHEM 351 Biochemistry (3) PR: CHEM 232, CHEM 232L
SET 20: Program Worksheet CHEM-EDCH

CHEM 352  Biochemistry (3) PR: CHEM 351

CHEM 354  Biochemistry Laboratory (1) PR: CHEM 351

CHEM 371  Chemical Synthesis Character (3) PR: CHEM 221, CHEM 221L, CHEM 232, CHEM 232L

CHEM 381*  Internship (1, repeatable up to 4) PR: Junior or senior standing and at least a 2.50 GPA both overall and in major

CHEM 399*  Tutorial (3; repeatable up to 12) PR: Junior or senior standing and at least a 2.50 GPA both overall and in major

CHEM 481  Introductory Research (2) PR: Instructor permission

CHEM 482  Introductory Research II (2) PR: Instructor permission

CHEM 490  Chemistry and Biochemistry Seminar (1) PR: Junior or senior standing

CHEM 511  Advanced Inorganic Chemistry (3) PR or CO: CHEM 341, CHEM 341L and CHEM 342, CHEM 342L

CHEM 512L  Advanced Inorganic Chemistry Laboratory (1) PR or CO: CHEM 511

CHEM 521  Instrumental Analysis (4) PR: CHEM 221, CHEM 221L; CO: CHEM 521L

CHEM 521L  Instrumental Analysis (0)

CHEM 522  Environmental Chemistry (3) PR: CHEM 221; CO: CHEM 522L

CHEM 522L  Environmental Chemistry Laboratory (1) CO: CHEM 522

CHEM 526  Introduction to Nuclear and Radiochemistry (1) PR: CHEM 221, CHEM 221L OR CHEM 231, CHEM 231L

CHEM 528  Nuclear and Radiochemistry (3) PR: CHEM 221 or CHEM 234

CHEM 531  Advanced Organic Chemistry (3) PR: CHEM 232, CHEM 232L

Notes: *CHEM 381 is repeatable up to 4 credit hours earned. *CHEM 399 is repeatable up to 12 credit hours earned.

Math Requirement

☐ MATH 120  Introductory Calculus (4) PR: Placement or C- or better in MATH 111

☐ MATH 222  Calculus with Applications  (5) PR: MATH 120 or HONS 115

Notes:

- Honors students can take the alternative sequence of HONS 191/HONS 191L, HONS 192/HONS 192L, HONS 293/HONS 293L, and HONS 294/HONS 294L in lieu of CHEM 111/111L, CHEM 112/112L, CHEM 231/231L, and CHEM 232/232L.

Secondary Cognate Major Requirements

"PR" indicates a pre-requisite. "CO" indicates a co-requisite.

Courses within this major may also satisfy general education requirements. Please consult http://registrar.cofc.edu/general-education for more information.

Students interested in teacher certification in secondary education must complete a content major, additional coursework required for certification (if applicable), and the secondary education cognate major requirements. Content majors are available in biology (Bachelor of Science Teaching Option), chemistry (Bachelor of Arts), English (Bachelor of Arts),
SET 20: Program Worksheet CHEM-EDCH

history (Bachelor of Arts, for certification in social studies), mathematics (Bachelor of Science teacher education track), physics (Bachelor of Arts). Students must successfully complete all requirements for certification in secondary education.

Required Courses

☐ COMM 104 Public Speaking (3) PR: None

☐ EDFS 201* Foundations of Education (3) PR: Sophomore standing.

Note: *EDFS 201 is prerequisite to all other education courses with a grade of C or better.

☐ EDFS 303* Human Growth and the Educational Process (3) PR: None

☐ EDFS 326* Integrating Technology Into Teaching (3) PR: None

☐ EDFS 330* Classroom and Behavior Management (3) PR: EDFS 201 and class rank of junior or above

☐ EDFS 345 Introduction to the Education of Exceptional Children and Youth (3) PR: EDFS 303 or equivalent.

☐ EDFS 455 Literacy and Assessment in the Content Areas (3) PR: None

☐ EDFS 456 Teaching Strategies in the Content Areas (English, Math, Science, Social Studies) (3) PR: None

Note: *Candidates who have received credit for PSYC 224 (previously listed as PSYC 311) prior to beginning a teacher education program should not take EDFS 303 (credit will not be awarded). Students must enroll in the Secondary sections for each of the courses marked with an asterisk. (See associate department chair to register for courses.) Each course requires a school-based field experience. Students will need a 3-hour block of time per week between the hours of 7 a.m. and 2 p.m. Monday through Friday, to complete each school-based experience.

Clinical Practice Internship Requirement

☐ EDFS 460* Clinical Practice in the Content Area (12) PR: Admission to a teacher education program and completion of all education requirements.

Note: *Students seeking recommendation for South Carolina certification in Secondary Education must complete the program of study above and meet the admission, retention, and exit requirements of the program and the School of Education, Health, and Human Performance. Recommendation to the South Carolina Department of Education for certification in South Carolina is contingent upon successful completion of Clinical Practice, and achievement of passing scores on the necessary Praxis II test(s) for recommendation. Students who do not take Clinical Practice may not earn a degree in Secondary Education and will not be recommended for certification. See your faculty advisor for additional information.

Additional Coursework required beyond Content major (Chemistry, BA) for Chemistry Certification:

☐ PHYS 101 Introductory Physics (3) PR: None; CO or PR: PHYS 101L

☐ PHYS 101L Introductory Physics Lab (1) CO: PHYS 101

AND

☐ PHYS 102 Introductory Physics II (3) PR: PHYS 101 or PHYS 111 or HONS 157; CO: PHYS 102L

☐ PHYS 102L Introductory Physics Lab (1) CO: PHYS 102

OR

☐ PHYS 111 General Physics I (3) PR or CO: MATH 120 or equivalent or instructor permission; CO: PHYS 111L

☐ PHYS 111L General Physics I Lab (1) CO: PHYS 111

AND
SET 20: Program Worksheet CHEM-EDCH

☐ PHYS 112  General Physics II (3) PR: PHYS 111 or HONS 157; CO or PR: MATH 220 or equivalent or instructor permission; CO: PHYS 112L

☐ PHYS 112L General Physics II Lab (1); CO: PHYS 112

Notes:

- You should apply for admission (this is NOT declaring your major) to the Teacher Education Program the semester you are enrolled in EDFS 201 Foundations of Education. Requirements for admission:
  - Minimum overall GPA of 2.50 and 60 earned credit hours.
  - Passing score on the 3 components of the PRAXIS 1: Pre-Professional Skills Test (Reading, Writing, and Mathematics) as designated by the South Carolina Department of Education OR qualifying SAT or ACT scores.
  - Disposition forms from (a) a general education faculty member, (b) your EDFS 201 professor, and (c) someone who has observed you working with children.
  - If a student has transfer credit for a course that is equivalent to EDFS 201, they must meet with the Teacher Education department chair and complete 1 hour of work.
  - A grade of C or better in EDFS 201 Foundations of Education.

- Your admission process must be completed before beginning the professional program.

- You must complete a major in the content area and the cognate major to be forwarded to the State Department of Education for certification.
This roadmap is a suggested semester-by-semester planning guide for this major. It is a model four-year plan, not a guaranteed sequence or contract. Course availability may vary from semester to semester. Roadmaps are not meant to cover every possibility. They are intended to provide guidance in planning your academic path. Roadmaps should be reviewed in consultation with your advisor.

### KEY
- **Course Subject and Number:** Lists the course subject and number (ex. MATH 111; ARTH 101).
- **Credit Hrs:** Lists how many credit hours the course is worth. Courses listed with a range of credit hours depend on course selection.
- **Min. Grade:** Lists if the major has a minimum grade requirement for this course.
- **Critical:** Indicates whether or not this major course can also fulfill a general education requirement.
- **ENGL:** GenEd English
- **HUMS:** GenEd Humanities
- **SOSCI:** GenEd Social Science
- **FLANG:** GenEd Foreign Language
- **MATH:** GenEd Math
- **HIST:** GenEd History
- **NATSCI:** GenEd Natural Science
- **Course Notes:** Lists important information about the course or the timing of the course.

### General Education Requirement
- **English:** ENGL 110 (6 credit hours) is required unless credit is awarded for AP, IB and/or Transfer English credit. A degree candidate must enroll in ENGL 110 in the first year and each subsequent semester until the English requirement has been fulfilled.
- **Foreign Language:** Satisfactory completion of the 202-level or its equivalent or demonstration of proficiency at that level from one of the following: Arabic, Chinese, French, Ancient Greek, German, Hebrew, Hindi, Italian, Japanese, Latin, Portuguese, Russian, or Spanish.
- **History:** Complete one course in pre-modern history and one course in modern history from the list of approved courses satisfying the history requirement (6 credit hours).
- **Humanities:** Complete 12 credit hours from the approved humanities area with no more than 6 credit hours in any one of the areas (except interdisciplinary HONS).
- **Math/Logic:** Complete 6 credit hours of approved courses in mathematics or logic, in any combination.
- **Natural Science:** Complete 8 credit hours of an introductory or higher sequence (of which 2 credit hours must be earned in the accompanying laboratories) from one of the following: Astronomy, Biology, Chemistry, Geology, Physics.
- **Social Sciences:** Complete 6 credit hours from one or two of the approved social science areas.
- **First-Year Experience:** All entering students with less than one year of college experience are required to complete a First-Year Experience (First-Year Seminar (FYSM), a Learning Community (LC), or an Honors College First-Year Experience course) within their first three semesters of academic tenure.

### Degree Requirements

<table>
<thead>
<tr>
<th>Minimum GPA</th>
<th>Minimum Credit Hours</th>
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<tr>
<td>Major</td>
<td>Cumulative 122 credit hours</td>
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<td>2.00</td>
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</table>

Additional hours are required for earning more than one degree. Consult your academic catalog.
**First Year**

### Semester One (17 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
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<td>MATH 111</td>
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<td>Pre-calculus</td>
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<td>HONS 110 (Gen Ed English)</td>
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<td>Y</td>
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<td>Counts for Gen Ed English</td>
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<tr>
<td>General Education Requirement Lang #1</td>
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<td>HONS 100</td>
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### Semester Two (17 credit hours)

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<td>MATH 120</td>
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<td>General Education Requirement His #1</td>
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<td>English or foreign language recommended</td>
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<tr>
<td>General Education Requirement Lang #2</td>
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<td>English or foreign language recommended</td>
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<td>FYSM (Choose a Gen Ed option)</td>
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<td>Select one that counts for Gen Ed Soc or His</td>
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### First Year Notes

1. The General Education English requirement should be completed within the first or second semester.

2. General Education First-Year Experience Requirement: All entering students with less than one year of college experience are required to complete a First-Year Experience (First-Year Seminar (FYSM), a Learning Community (LC), or an Honors College First-Year Experience course) within their first three consecutive academic terms.
### Second Year

#### Semester Three (18 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
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<tbody>
<tr>
<td>Math 229</td>
<td>5</td>
<td>4</td>
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<td>Vector calculus needs to be completed before taking physical chemistry</td>
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<td>CHEM 293/293L</td>
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<td>HONS 120 (Gen Ed Humanities #1)</td>
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#### Semester Four (17 credit hours)

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<th>GenEd</th>
<th>Course Notes</th>
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<td>CHEM 294/294L</td>
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<td>Physics 111/111L</td>
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<td>HONS 130 (Gen Ed Humanities #2)</td>
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#### Second Year Notes

Note 1:  Sample: Study abroad?

Note 2:
## Third Year

### Semester Five (18 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
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<td>CHEM 220/220L</td>
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<td>CHEM 351/354</td>
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<td>HONS 380</td>
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### Semester Six (16 credit hours)

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<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
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<th>GenEd</th>
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<td>CHEM 481</td>
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</tbody>
</table>

### Third Year Notes

Note 1: Research can be taken for credit at CofC if the work is done at MUSC; Student must arrange for a faculty member to oversee the requirements of the course locally.

Note 2:
**Fourth Year**

### Semester Seven (18 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
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<td>CHEM 341/341L</td>
<td>4</td>
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</tr>
<tr>
<td>BIOL 112/112L</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Soc #2</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>CHEM 490</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>Guest seminar format; can be repeated</td>
</tr>
<tr>
<td>HONS 499</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>General Education Hum #3</td>
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</table>

### Semester Eight (18 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOC lecture elective</td>
<td>2-3</td>
<td></td>
<td></td>
<td></td>
<td>Inorganic Chemistry is only offered in the spring</td>
</tr>
<tr>
<td>CHEM 311/312L</td>
<td>4</td>
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</tr>
<tr>
<td>General Education Hum #4</td>
<td>3</td>
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</tr>
<tr>
<td>CHEM 492</td>
<td>1</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>HONS 499</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Molecular Biology</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Fourth Year Notes

- Note 1: Sample: Must meet with advisor before registering for Bachelor’s Essay.

- Note 2: Don’t forget to apply to graduate in MyCharleston!

- Note 3: If student wants to continue research without writing a Bachelor’s Essay, Chem 397 is a zero credit research course that is graded either Satisfactory or
SET 21: Roadmap New Biochem Major for HONORS student

Unsatisfactory
This roadmap is a suggested semester-by-semester planning guide for this major. It is a model four-year plan, not a guaranteed sequence or contract. Course availability may vary from semester to semester. Roadmaps are not meant to cover every possibility. They are intended to provide guidance in planning your academic path. Roadmaps should be reviewed in consultation with your advisor.

**Course Subject and Number:** Lists the course subject and number (ex. MATH 111, ARTH 101).

**Credit Hrs.:** Lists how many credit hours the course is worth. Courses listed with a range of credit hours depend on course selection.

**Min. Grade:** Lists if the major has a minimum grade requirement for this course.

**Critical:** Indicates whether or not this major course can also fulfill a general education requirement.

**GenEd:**
- ENGL: GenEd English
- HUMS: GenEd Humanities
- FLANG: GenEd Foreign Language
- MATH: GenEd Math
- HIST: GenEd History
- NATSCI: GenEd Natural Science

**Course Notes:** Lists important information about the course or the timing of the course.

**General Education Requirement**

**English:** ENGL 110 (4 credit hours) is required unless credit is awarded for AP, IB, or other transfer English credit. A degree candidate must enroll in ENGL 150 in the first year and each subsequent semester until the English requirement has been fulfilled.

**Foreign Language:** Satisfactory completion of the 202 level or its equivalent or demonstration of proficiency at that level from one of the following: Arabic, Chinese, French, Ancient Greek, German, Hebrew, Hindi, Italian, Japanese, Latin, Portuguese, Russian, or Spanish.

**History:** Complete one course in pre-modern history and one course in modern history from the list of approved courses satisfying the history requirement (6 credit hours).

**Humanities:** Complete 12 credit hours from the approved Humanities area with no more than 6 credit hours in any one of the areas (except interdisciplinary HONs).

**Math/Logic:** Complete 6 credit hours of approved courses in mathematics or logic, in any combination.

**Natural Science:** Complete 8 credit hours of an introductory or higher sequence (of which 2 credit hours must be earned in the accompanying laboratory) from one of the following: Astronomy, Biology, Chemistry, Geology, Physics.

**Social Sciences:** Complete 6 credit hours from one or two of the approved social science areas.

**First-Year Experience:** All entering students with less than one year of college experience are required to complete a First-Year Experience (First-Year Seminar [FYSM], a Learning Community [LC], or an Honors College First-Year Experience course) within their first three consecutive academic terms.

**Degree Requirements**

<table>
<thead>
<tr>
<th>Minimum GPA</th>
<th>Minimum Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00</td>
<td>122</td>
</tr>
</tbody>
</table>

**Additional hours are required for earning more than one degree. Consult your academic catalog.**
SET 21: Roadmap New Biochem Major
For additional information on course descriptions, pre-requisites and degree requirements for this major, please consult your Undergraduate Catalog.

First Year

<table>
<thead>
<tr>
<th>Semester One (15 credit hours)</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111/111L</td>
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<tr>
<td>MATH 111</td>
<td>4</td>
<td></td>
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<td></td>
<td>Pre-calculus</td>
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<tr>
<td>First Year Experience</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>FYE is required; recommend to have it count in Gen Ed</td>
</tr>
<tr>
<td>General Education Requirement</td>
<td>4</td>
<td></td>
<td></td>
<td>Y</td>
<td>English 110 or foreign language recommended</td>
</tr>
<tr>
<td>Lang #1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Two (17 credit hours)</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 112/112L</td>
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<td>Y</td>
<td></td>
</tr>
<tr>
<td>MATH 120</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Requirement Eng #1</td>
<td>3</td>
<td></td>
<td></td>
<td>Y</td>
<td>English or foreign language recommended</td>
</tr>
<tr>
<td>General Education Requirement Lang #2</td>
<td>3</td>
<td></td>
<td></td>
<td>Y</td>
<td>English or foreign language recommended</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

First Year Notes

Note 1: The General Education English requirement should be completed within the first or second semester.

Note 2: General Education First-Year Experience Requirement: All entering students with less than one year of college experience are required to complete a First-Year Experience (First-Year Seminar (FYSM), a Learning Community (LC), or an Honors College First-Year Experience course) within their first three consecutive academic terms.
<table>
<thead>
<tr>
<th>Semester Three (16 credit hours)</th>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 220/220L</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Quantitative Analysis; 220L is a six hour lab; this class is offered both Spring and Fall terms</td>
</tr>
<tr>
<td>CHEM 231/231L</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Organic Chemistry I; this class is offered both Spring and Fall terms</td>
</tr>
<tr>
<td>BIOL 111/111L</td>
<td>4</td>
<td></td>
<td></td>
<td>Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Requirement Lang #3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Four (16 credit hours)</th>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 232/232L</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Note: recommended grade from 231 before proceeding to 232 is a C; this class is offered both Spring and Fall terms</td>
</tr>
<tr>
<td>BIOL 112/112L</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Math 229</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vector calculus needs to be completed before taking physical chemistry</td>
</tr>
<tr>
<td>General Education Requirement Lang #4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>Y</td>
<td></td>
</tr>
</tbody>
</table>

Second Year Notes

Note 1: Sample: Study abroad?

Note 2:
### Semester Five (15 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 111/111L</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>Completion of Physics prior to Chem 341/Chem 342 is recommended</td>
</tr>
<tr>
<td>CHEM 351/354</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>Biochemistry I; This class does not have an associated lab; Chem 351 is offered both Spring and Fall terms; Chem 232 is a pre-req</td>
</tr>
<tr>
<td>General Education His #1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>Research is recommended and can count towards the biochemistry elective lab credits; student must arrange to work with a faculty mentor; individual enrollment course</td>
</tr>
<tr>
<td>General Education Hum #1</td>
<td>3</td>
<td></td>
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<td></td>
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<tr>
<td>CHEM 481</td>
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</table>

### Semester Six (17-18 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 352</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>Physical Chemistry II; Chem 342 is only offered in the Spring</td>
</tr>
<tr>
<td>General Education Hum #2</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>General Education His #2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>CHEM 482</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>Research is recommended and can count towards the biochemistry elective lab credits; student must arrange to work with a faculty mentor; individual enrollment course</td>
</tr>
<tr>
<td>Physics 112/112L</td>
<td>4</td>
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<tr>
<td>Biochemistry lecture elective</td>
<td>2-3</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Third Year Notes

Note 1: Research can be taken for credit at CofC if the work is done at MUSC; Student must arrange for a faculty member to oversee the requirements of the course locally.

Note 2:
### Fourth Year:

#### Semester Seven (18 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 341/341L</td>
<td>4</td>
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<tr>
<td>Molecular Biology</td>
<td>4</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Soc #1</td>
<td>3</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>CHEM 490</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>Guest seminar format; can be repeated</td>
</tr>
<tr>
<td>CHEM 499</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>Optional: Continuation of research towards Bachelor's Essay (recommended)</td>
</tr>
<tr>
<td>General Education Hum #3</td>
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<td></td>
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</tr>
</tbody>
</table>

#### Semester Eight (17 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
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</thead>
<tbody>
<tr>
<td>CHEM 342/342L</td>
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<tr>
<td>CHEM 311</td>
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<td>Inorganic Chemistry is only offered in the spring</td>
</tr>
<tr>
<td>General Education Hum #4</td>
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<td></td>
<td></td>
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<tr>
<td>CHEM 492</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Chem 499</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Soc #2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Fourth Year Notes

Note 1: Must meet with advisor before registering for Bachelor's Essay.
Note 2: Don't forget to apply to graduate in MyCharleston!

Note 3: If student wants to continue research without writing a Bachelor's Essay, Chem 397 is a zero credit research course that is graded either Satisfactory or Unsatisfactory.
This roadmap is a suggested semester-by-semester planning guide for this major. It is a model four-year plan, not a guaranteed sequence or contract. Course availability may vary from semester to semester. Roadmaps are not meant to cover every possibility. They are intended to provide guidance in planning your academic path. Roadmaps should be reviewed in consultation with your advisor.

**MAJOR ROADMAP**

Chemistry, BS  
Catalog Year: 2013-14

---

<table>
<thead>
<tr>
<th>Course Subject and Number:</th>
<th>Lists the course subject and number (ex. MATH 111; ARTH 101).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credit Hrs:</td>
<td>Lists how many credit hours the course is worth. Courses listed with a range of credit hours depend on course selection.</td>
</tr>
<tr>
<td>Min. Grade:</td>
<td>Lists if the major has a minimum grade requirement for this course.</td>
</tr>
<tr>
<td>Critical:</td>
<td>TIME = Timing. This course must be completed in the semester listed to ensure a timely graduation.</td>
</tr>
<tr>
<td>GenEd</td>
<td>Indicates whether or not this major course can also fulfill a general education requirement.</td>
</tr>
<tr>
<td>ENGL: GenEd English</td>
<td>HUMS: GenEd Humanities</td>
</tr>
<tr>
<td>FLANG: GenEd Foreign Language</td>
<td>MATH: GenEd Math</td>
</tr>
<tr>
<td>HIST: GenEd History</td>
<td></td>
</tr>
<tr>
<td>Course Notes:</td>
<td>Lists important information about the course or the timing of the course.</td>
</tr>
</tbody>
</table>

---

### General Education Requirement

- **English:** ENGL 110 (4 credit hours) is required unless credit is awarded for AP, IB and/or Transfer English credit. A degree candidate must enroll in ENGL 110 in the first year and each subsequent semester until the English requirement has been fulfilled.

- **Foreign Language:** Satisfactory completion of the 202 level or its equivalent or demonstration of proficiency at that level from one of the following: Arabic, Chinese, French, Ancient Greek, German, Hebrew, Hindi, Italian, Japanese, Latin, Portuguese, Russian, or Spanish.

- **History:** Complete one course in pre-modern history and one course in modern history from the list of approved courses satisfying the history requirement (6 credit hours).

- **Humanities:** Complete 12 credit hours from the approved Humanities area with no more than 6 credit hours in any one of the areas (except interdisciplinary HONS).

- **Math/Logic:** Complete 6 credit hours of approved courses in mathematics or logic, in any combination.

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- **Social Sciences:** Complete 6 credit hours from one or two of the approved social science areas.

- **First-Year Experience:** All entering students with less than one year of college experience are required to complete a First-Year Experience (First-Year Seminar, FYSEM), a Learning Community (LC), or an Honors College First-Year Experience course within their first three consecutive academic terms.

---

### Degree Requirements

<table>
<thead>
<tr>
<th>Minimum GPA</th>
<th>Minimum Credit Hours</th>
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<tbody>
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<td>Major</td>
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</tr>
<tr>
<td>Cumulative</td>
<td>2.00</td>
</tr>
</tbody>
</table>

Additional hours are required for earning more than one degree. Consult your academic catalog.
<table>
<thead>
<tr>
<th>Semester One (15 credit hours)</th>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111/111L</td>
<td>4</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td>Recommended minimum grade before proceeding to Chem 112 is a C</td>
</tr>
<tr>
<td>MATH 111</td>
<td>4</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td>Pre-calculus</td>
</tr>
<tr>
<td>First Year Experience Course</td>
<td>3</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td>Recommend to select course that counts towards Gen Ed requirement too</td>
</tr>
<tr>
<td>General Education Requirement</td>
<td>4</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td>English 110 or foreign language recommended</td>
</tr>
<tr>
<td>Lang #1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Semester Two (17 credit hours)</th>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 112/112L</td>
<td>4</td>
<td>Y</td>
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<td></td>
<td></td>
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<tr>
<td>MATH 120</td>
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<td>Y</td>
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<td></td>
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</tr>
<tr>
<td>General Education Requirement Eng #1</td>
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<td>Y</td>
<td></td>
<td></td>
<td></td>
<td>English or foreign language recommended</td>
</tr>
<tr>
<td>General Education Requirement Lang #2</td>
<td>3</td>
<td>Y</td>
<td></td>
<td></td>
<td></td>
<td>English or foreign language recommended</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

First Year Notes

Note 1: The General Education English requirement should be completed within the first or second semester.

Note 2: General Education First-Year Experience Requirement: All entering students with less than one year of college experience are required to complete a First-Year Experience (First-Year Seminar (FYSE), a Learning Community (LC), or an Honors College First-Year Experience course) within their first three consecutive academic terms.
### Second Year

#### Semester Three (15 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 221/221L</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>Quantitative Analysis; 221L is a six hour lab; this class is offered both Spring and Fall terms</td>
</tr>
<tr>
<td>CHEM 231/231L</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>Organic Chemistry I; this class is offered both Spring and Fall terms</td>
</tr>
<tr>
<td>BIOL 111/111L</td>
<td>4</td>
<td></td>
<td>Y</td>
<td></td>
<td>Completion of Physics prior to Chem 341/Chem 342 is recommended</td>
</tr>
<tr>
<td>General Education Requirement Lang #3</td>
<td>3</td>
<td></td>
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</tbody>
</table>

#### Semester Four (15 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 232/232L</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>Note: recommended grade from 231 before proceeding to 232 is a C; this class is offered both Spring and Fall terms</td>
</tr>
<tr>
<td>BIOL 112/112L</td>
<td>4</td>
<td></td>
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</tr>
<tr>
<td>Math 220</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>Calculus II—course needs to be completed prior to taking Chem 341/Chem 342</td>
</tr>
<tr>
<td>General Education Requirement Lang #4</td>
<td>3</td>
<td></td>
<td></td>
<td>Y</td>
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</tr>
</tbody>
</table>

#### Second Year Notes

Note 1: Sample: Study abroad?

Note 2:
### Third Year

**Semester Five (19 credit hours)**

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 111/111L</td>
<td>4</td>
<td></td>
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<tr>
<td>CHEM 351</td>
<td>3</td>
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<tr>
<td>General Education HIS #1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Hum #1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 481</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>Research is recommended; student must arrange to work with a faculty mentor; individual enrollment course</td>
</tr>
<tr>
<td>Biology Elective</td>
<td>4</td>
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</tbody>
</table>

**Semester Six (16 credit hours)**

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 352/354</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>Physical Chemistry II; Chem 342 is only offered in the Spring</td>
</tr>
<tr>
<td>General Education Hum #2</td>
<td>3</td>
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<td></td>
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</tr>
<tr>
<td>General Education His #2</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 482</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td>Research is recommended; student must arrange to work with a faculty mentor; individual enrollment course</td>
</tr>
<tr>
<td>Physics 112/112L</td>
<td>4</td>
<td></td>
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</tbody>
</table>

**Third Year Notes**

Note 1: Research can be taken for credit at CoFC if the work is done at MUSC; Student must arrange for a faculty member to oversee the requirements of the course locally.

Note 2:
### Semester Seven (18 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 341/341L</td>
<td>4</td>
<td></td>
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</tr>
<tr>
<td>Molecular Biology</td>
<td>4</td>
<td></td>
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</tr>
<tr>
<td>General Education Soc #1</td>
<td>3</td>
<td></td>
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</tr>
<tr>
<td>CHEM 490</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>Guest seminar format; can be repeated</td>
</tr>
<tr>
<td>CHEM 499</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>Optional: Continuation of research towards Bachelor's Essay (recommended)</td>
</tr>
<tr>
<td>General Education Hum #3</td>
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### Semester Eight (17 credit hours)

<table>
<thead>
<tr>
<th>Course Subject and Number</th>
<th>Credit Hrs.</th>
<th>Min. Grade</th>
<th>Critical</th>
<th>GenEd</th>
<th>Course Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 342/342L</td>
<td>4</td>
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<tr>
<td>CHEM 511</td>
<td>3</td>
<td></td>
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<td></td>
<td>Inorganic Chemistry is only offered in the spring</td>
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<tr>
<td>General Education Hum #4</td>
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<tr>
<td>CHEM 492</td>
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</tr>
<tr>
<td>Chem 499</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Education Soc #2</td>
<td>3</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Fourth Year Notes
SET 21: Roadmap Biochem 85 Old

Note 1: Sample: Must meet with advisor before registering for Bachelor's Essay.

Note 2: Don't forget to apply to graduate in MyCharleston!

Note 3: If student wants to continue research without writing a Bachelor's Essay, Chem 397 is a zero credit research course that is graded either Satisfactory or Unsatisfactory.